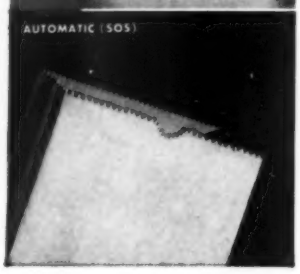
PIT AND QUARRY

NOVEMBER 1954

Pit Operations of the Hamlin Sand and Gravel Company near Hamlin, Tex.

Table of Contents, Page 10.



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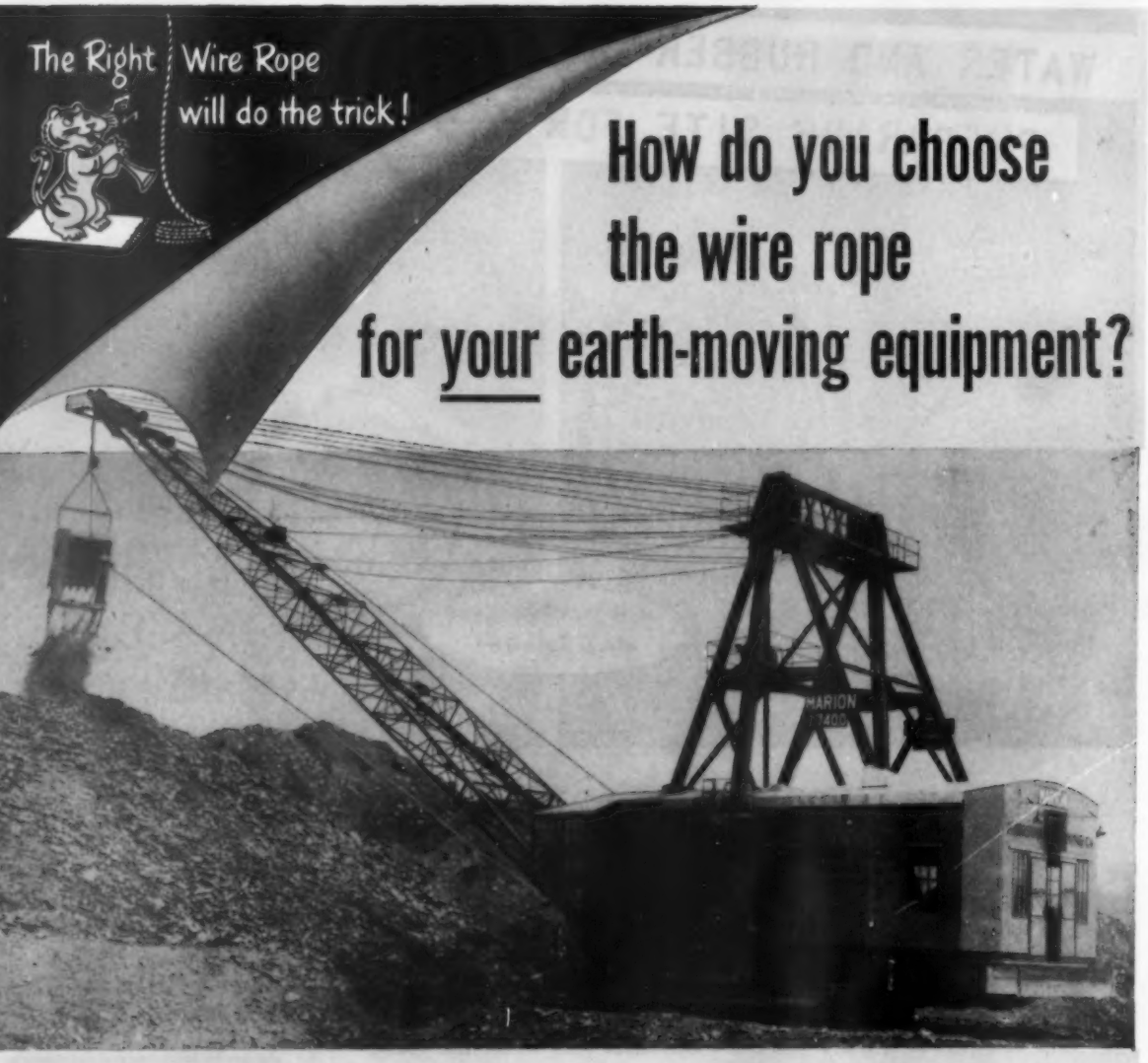

EVERY wire rope on your stripping or excavating machinery needs a particular combination of strength, fatigue resistance, and flexibility. Hoist ropes on big power shovels need high tensile strength to absorb impact stresses and must be extremely tough to withstand constant bending over sheaves. On draglines, drag ropes must possess high strength combined with great abrasion resistance. Boom ropes must have strength plus fatigue resistance.

There's an American Tiger Brand Wire Rope that has been especially designed for every grueling rope job that you will encounter. And it pays to spend a little extra time to analyze your rope requirements carefully and determine exactly which Tiger Brand Rope is the best one to use.

Our experienced Wire Rope Engineers will be glad to help you do this. They know what every Tiger Brand Rope can do and what type of rope every job requires. Their assistance assures you of getting the *right* rope for every job; and that saves you money. Remember, the right rope often lasts up to twice as long as the wrong one. Free engineering service is available through our nearest District Sales Office or by writing to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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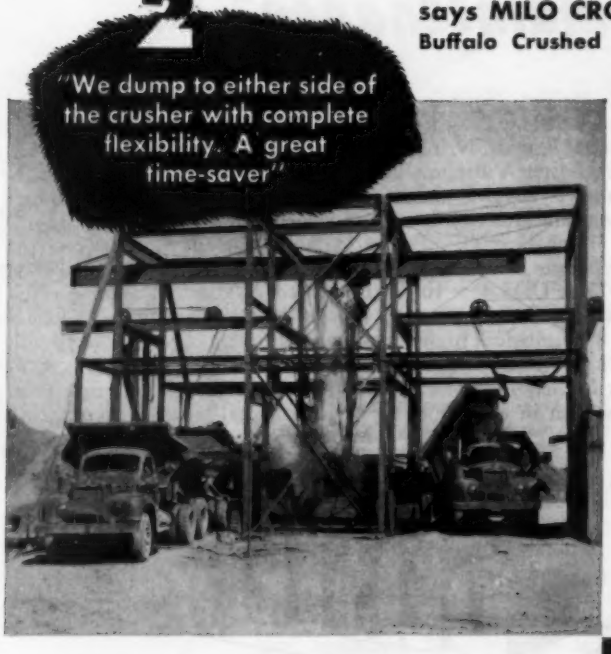
UNITED STATES STEEL

Change over to tandem hauling for increased capacity at low cost.

"Tandem hauling and two-way dumping are two profitable advantages of the Easton side-dump idea"

says MILO CROUSE, Manager of Operations
Buffalo Crushed Stone Corp., Bowmansville, N. Y.



"At comparatively small cost, our changeover from 12 Easton trailers to 6 Easton truck-and-trailer tandems gave us all the increased haulage capacity we needed. Our past experience with Easton side-dumps, through 5,000,000 tons of all-weather production, proved the dependability of Easton equipment. Easton tandems require practically no maintenance; they are on the job day after day, giving fast service to three shovels in two different quarries."

Easton engineers can show you the way to new economies with side-dump off-highway hauling. Write today to:

Easton Car & Construction Company • Easton, Pa.

Easton overhead dumping system provides remote stop-and-hold control. Easton two-way dumping permits the tandems to pull up to either side of the crusher at will. *Cab-controlled hydraulic dumping is also available with Easton side-dumps.*

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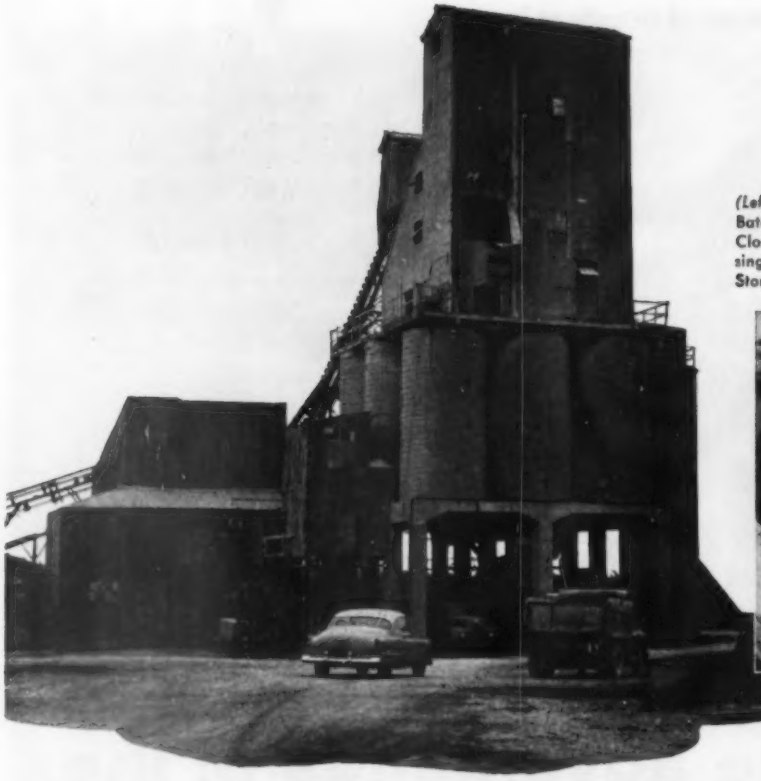
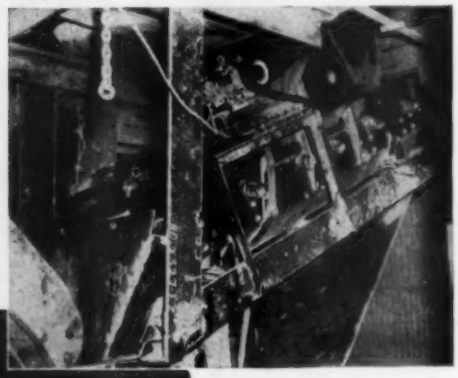
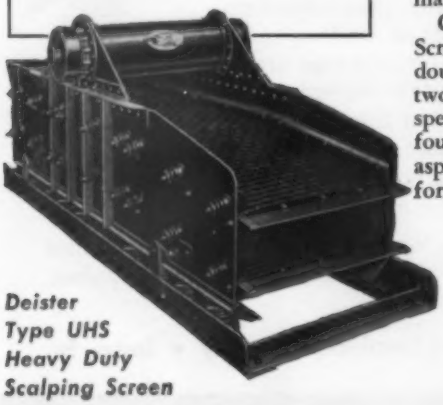


(Left) Exterior view of Genesse Stone Products Corporation, Batavia, N. Y., which has capacity of 1500 tons per day. Close-up *(below)* shows one of two Deister Type SL 4′ x 8′ single-deck high-speed Ag-Lime Screens in use at Genesse Stone, equipped with 16 mesh cloth.



"Deister Screens . . . don't need constant attention or maintenance"

Deister Machine Company, specialists and pioneers in the design, installation and manufacture of Vibrating Screens, offers over 100 standard models to fit your toughest screen problems. Deister Screens are available in 1-, 2-, 3-, 4-deck types, in sizes from 2¼′ x 4′ to 5′ x 14′.



Deister Type UHS Heavy Duty Scalping Screen

Mr. Arnold W. Heisler, Superintendent of the Genesse Stone Product Corporation's plant at Batavia, N. Y., says: "I like the Deister Vibrating Screens because they're rugged, and they don't need constant attention or maintenance".

Genesse Stone operates five Deister Screens . . . two Type UHS 4′ x 10′ double-deck Vibrating Screens, and two Type SL 4′ x 8′ single-deck high-speed Ag-Lime Screens. A 4′ x 8′ four-deck Deister in Genesse Stone's asphalt plant has been in operation for six years.

"Deister Screens are easy to install," Mr. Heisler says. "We can put them in over a weekend. And a big advantage in using Deister Screens is that they do not vibrate the supporting structure in the screening tower."

Ask the owner of the Deister Screen nearest you . . . and you'll be convinced of the outstanding efficiency of the Deister *opposed elliptical throw design*, and the *rugged, trouble-free wear life* which is common to all Deister Vibrating Screens. Write or call *now* for complete information.

DEISTER

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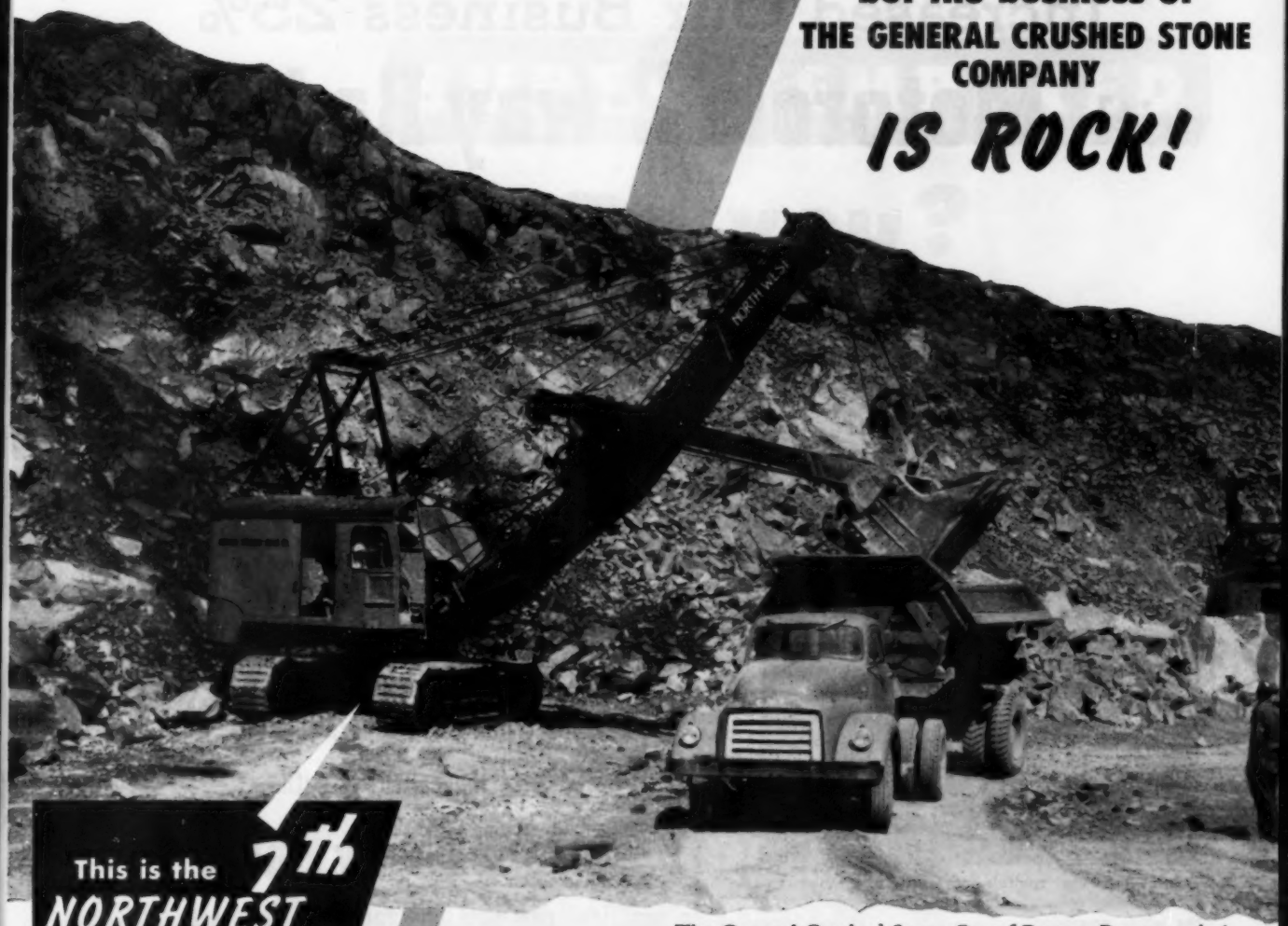
1933 EAST WAYNE STREET, FORT WAYNE 4, INDIANA

ANY SHOVEL CAN DIG DIRT...

but the business of THE GENERAL CRUSHED STONE COMPANY IS ROCK!



This is the 7th NORTHWEST for the pits of THE GENERAL CRUSHED STONE COMPANY Easton, Pa.

The General Crushed Stone Co. of Easton, Pa., puts their machines in material that will really test equipment. Look at the samples in the picture. It is service in stuff like this that has made The General Crushed Stone Co. buy their 7th Northwest and their *5th 80-D.*

Northwests are *real* Rock Shovels! Get up on a Northwest sometime if you know operation. Get the feel of the controls yourself. Feel that crowd take a-hold. The dipper goes right on through as the hoist takes it up—no "re-starts" are required here. It's a full load in one cut. Remember the Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste—force that puts greater effectiveness at the dipper lip for handling tougher digging and producing more output.

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You can plan to have a Northwest. Now is the time to find out about Northwest design and operation. Why not talk it over with a Northwest man?

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Has Your Shovel Stood the ROCK TEST

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CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Ready Mix Concrete Operator Says:*

"Increased Our Business 25% with Motorola 2-way Radio!"

Central dispatcher controls entire fleet from main office . . . providing complete coordination and flexibility to the whole operation.

Greater control of operations leads to more Profits with

Motorola 2-way Radio

a practical new tool in Ready Mix Concrete

"We're now operating 20 trucks to capacity as against 16 last year —and to us that's good proof that Motorola 2-Way radio is a business getter as well as a money-maker on the job."

From similar reports it's clear that Motorola 2-way radio is enabling many ready mix operators to brush off headaches by the dozen. It establishes dispatcher control over most situations that would ordinarily develop into sure losses, quick rerouting to maintain close schedules, fast relief in breakdowns, better control of load estimates and deliveries, fewer unforeseen overtime penalties . . . all these factors are promptly controllable with Motorola 2-way radio.

Write or phone us at once for a Motorola engineer. He'll be glad to explain how for about $1.00 per day, per truck, you can greatly increase your profits. He'll tell you how Motorola, the largest *exclusively-radio* organization, will give you a firm contract for unexcelled *Motorola* service and maintenance. He'll tell you how Motorola makes it pay for you to own and operate your own 2-way radio system.

*Name in our files.

Motorola Communications & Electronics, Inc.

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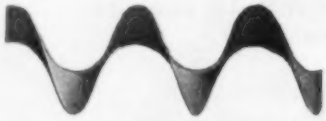
Make sure the screw conveyors you buy pass this quality test!

If they don't . . . investigate LINK-BELT's sound engineering and quality manufacture . . . your assurance of top performance

1. Is flighting accurately formed?

Link-Belt's specialized machinery assures accurate forming, producing uniformity of flighting curvature.

2. Are diameters uniform?



Only specially selected steels are used to meet Link-Belt's rigid specifications.

3. Will the hangers match your exact needs?

Hangers are available in gray iron or steel frames in a range of styles and with various bearing materials.

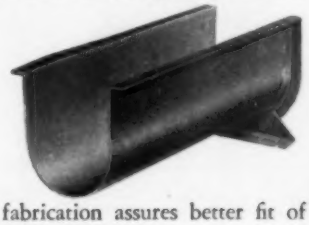
4. Will installation be easy?

Straightness is checked before shipping, and extra care is taken in handling and loading. Jig-drilled coupling bolt holes facilitate assembly.

5. Can gates be installed on the job?

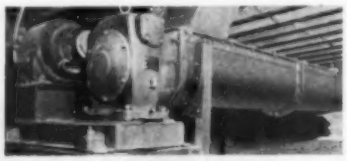
Gates are available for bolting or welding in place right on the job for ease of trough opening location.

6. Are troughs fabricated to your specifications?



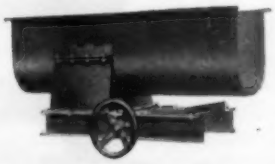
Link-Belt's accurate fabrication assures better fit of all components. Choice of metals to fit your need.

7. Is the drive fully integrated?



Only Link-Belt builds a complete line of gear and chain drives, couplings, bearings, shafting.

8. How wide a choice of spouts and gates do you have?



Discharge spouts and gates can be fixed or detachable. Hand or rack-and-pinion, flat or curved slide gates.

9. Is full ordering information readily available?

Link-Belt's 92-page Screw Conveyor Book 2289 contains complete ordering data. Ask your Link-Belt representative or distributor for your copy today.

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TRAYLOR CURVED CRUSHING SURFACES check lifting and churning of material by applying power as a direct crushing force. The result is a more uniform product at less cost per ton.

TRAYLOR BELL HEAD and CURVED CONCAVES place the crushing zone of smallest volume here, well above the opening where packing and choking commonly occur. Capacities of all succeeding zones are progressively greater . . . free discharge is assured.

The self-tightening bell head and curved concaves of a Traylor TY Reduction Crusher will increase capacities of your plant by checking choking and packing. Efficient application of crushing force produces a better, more uniform product with a lower percentage of oversize and waste fines . . . reduces power waste and costs to a minimum. Mail coupon today for free bulletin giving complete details on efficient, economical Traylor TY Reduction Crushers.

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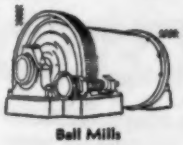
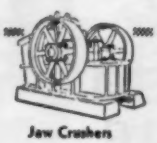
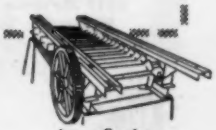


Ball Mills



Jaw Crushers



Apron Feeders

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In this issue

Editorial—Be Prepared! 12
News of the Industry 19
Thirty Years Ago in Pit and Quarry 50
Pioneer's Steilacoom Pit Has Largest Unit Excavator 72
Idaho Firm Adds Processing Plant to Produce Natural Pozzolan 75
Screenings 78
Technical Considerations in Natural Pozzolan Production—Part II 83
Washington News Letter 87
N.L.A. Operating Meeting Held in Milwaukee 88
Heavy-Duty Gears—Part II 103
Simple and Compact New Plant Designed Primarily for Production of Road Stone 107
American Mining Congress Attracts Huge Gathering in San Francisco 109
Wanted—A-1 Salesmen! Peddlers Keep Out! 118
Skanska's Cement Ships Feature Enroute Bagging 120
Merchandisable Sand and Gravel 134
Report on Current Labor Developments 141
Some Blasting Devices Used in a Spanish Quarry 152

The Concrete Manufacturer

Editorial—Do It Yourself—with Expert Advice 199
News of the Concrete Industry 203
One-Man Batching Controls Cut Costs, Improve Quality 208
Eastern Firm Brings Quarry Know-How into New Block Venture 209
How Concrete Pipe Is Manufactured 214
Ready-Mix Firm Uses Immersion Tube Heater for Winter Operations 220
Cost Accounting in Ready-Mixed Concrete 222
Marietta Concrete Corp. Builds Precast Swim Pool 228

New Machinery 58
More Information Please 131
Personal Mention 165
Obituaries 169
Legal Decisions 172
Traffic News 182
Trade Notes 186
Index to Advertisers 275

AUDITED PAID CIRCULATION ABC

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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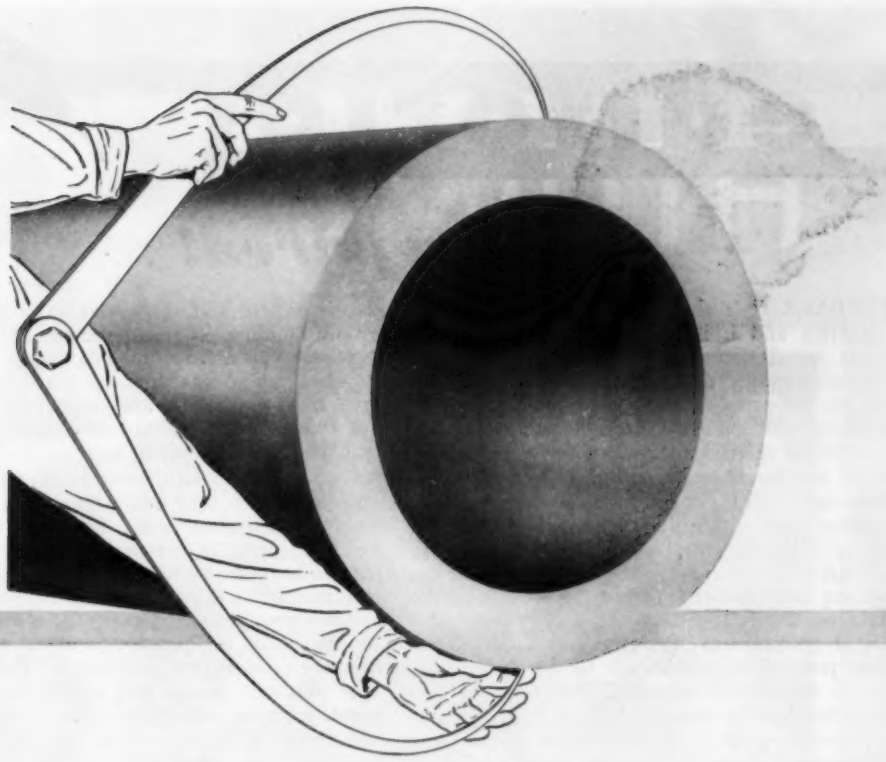

Designers benefit 5 ways

with B&W Hollow Forgings

These large-diameter, heavy-wall B&W pipes or tubes offer five specific advantages to the designer interested in better design with savings.

- Single lengths or many lengths can be "tailor-made" to suit specific requirements
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- Full forging properties are developed because the metal is thoroughly worked
- Concentricity is excellent
- A wide range of sizes is available

For further details about these forgings and how they may suit your requirements, write for Bulletin S-16.
The Babcock & Wilcox Company,
Process Equipment Department, Barberton, Ohio.

BABCOCK & WILCOX

S-433

editorial

Be Prepared!

"BE PREPARED" is the motto of the Boy Scouts of America and it is one which also applies in business at all times and under all conditions. Producers of nonmetallic minerals are constantly being admonished, in these pages and elsewhere, to be prepared for adverse developments. It is not so often that they are warned to prepare themselves for a volume of business which may be more than they can handle. The year now nearing its end will set a new record in building expenditures, and authorities are predicting another record year in 1955. But these predictions do not take into consideration the strong possibility of vastly expanded highway construction, not only in 1955, but also in succeeding years.

Producers of cement and aggregates are vitally interested in these possibilities and should be concerned over their ability to meet these expanded demands. The cement industry has steadily expanded its plant and is able to handle present record demands without strain. Any sharp and prolonged increase, however, would result in severe local and national shortages. The aggregates industries, operating at near record levels, may also find themselves unable to supply the volume needed.

A STEP in the right direction was taken when the board of directors of the American Road Builders' Association recently adopted a resolution calling on the highway industry to survey its ability to handle a vastly increased road building program. It was pointed out that extensive deficiencies exist in our national highway plant which prevent safe and efficient transportation and add to our defense problems. That these deficiencies are to be corrected is certain for these reasons: that a substantially-increased Federal-aid highway program becomes fully operative on July 1, 1955; that the President has called for an additional accelerated road-building program; and that further recommendations will be made. The A.R.B.A. board therefore is calling on its member industries and organizations to seek out potential bottlenecks in their respective fields of activity and initiate remedial procedures immediately. A.R.B.A. offered its facilities for receiving data from the industry and for presenting an accurate picture based on this information, to committees of Congress and other agencies of government. No doubt is to be left as to the ability of the industry to prosecute economically and efficiently a highway program on the scale proposed by the President and others.

THE A.R.B.A., we feel, is making a very important contribution to the future safety and prosperity of this country and should be extended full co-operation in its efforts. It should not be allowed to stand alone, however, because no roads can be built if all of the many needed materials, equipment, supplies, labor, engineers, etc., are not also available in adequate quantity. Each industry connected with highway work should immediately begin a similar program to determine its ability to meet the expected demands.

The cement and aggregates industries are vital factors in any building program, and their ability to meet these demands is of paramount importance. The cement industry as a whole has done an excellent job since World War II in expanding and improving its facilities and it has kept up with the steadily growing demand. In anticipation of a continued increase in demand several new plants are now under construction or definitely planned, and expansion of existing plants is continuing. What we are confronted with, however, is not a continued steady increase in demand but the prospect of a sharp expansion to a much higher rate of demand which may continue for ten years or more.

The aggregates industries are also confronted with the necessity for prompt analysis of their deficiencies and their subsequent correction. They have the advantage that new plants and expansions can be completed much more rapidly than in the cement industry. A disadvantage, however, is the fact that aggregates are a low-cost commodity and can be shipped economically for comparatively short distances. Producers, individually and collectively, and their associations will do well to study this problem and make all possible preparations. Each producer will be confronted with the possibility that if he cannot meet the needs in his area, someone else will move in and do so.

WHAT is urgently needed is complete information on the aggregates industries—the number and location of plants, their capacities and the amount of expansion possible, and the possibility of opening new plants and deposits in each area. Government figures on the cement industry are up to date, but those on aggregates are lagging several years.

The distribution of this highway work should, of course, be according to the need, and it should be free of political influence. According to authorities, the greatest need for road work is found in or near cities. Half the traffic in vehicle miles is in urban areas which also have the worst traffic conditions. In the last three years, however, only one dollar in six of road expenditures went for urban streets.

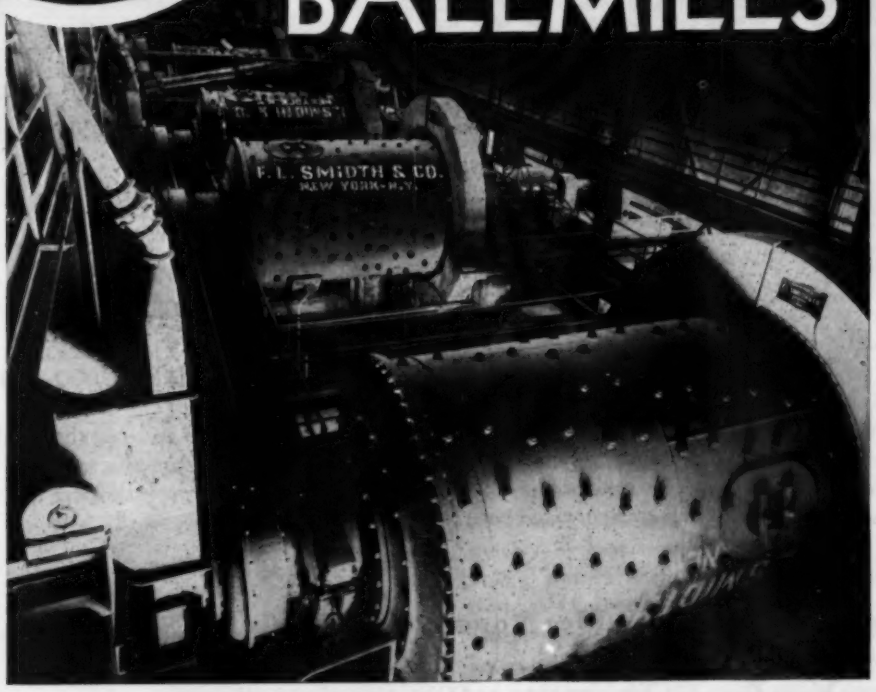
It is obvious from the above that a large part of the demand for aggregates can be supplied from existing operations expanded to meet the needs. Producers should also be prepared to set up temporary or portable plants to supply the demand in more remote areas.

We are not suggesting that aggregate or cement producers proceed at once to build new plants or enlarge existing ones in anticipation of this huge highway program. We urge, however, that they make a complete study of their facilities with this potential demand in mind; and if these are inadequate, we suggest that they make careful plans so that the necessary capacity can quickly be added when the need becomes evident.

Walter E. Trunkey

SMIDTH

BALLMILLS



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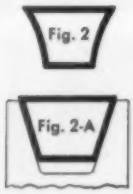
Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U. S. PAT. 1813698)



You find that the CONCAVE SIDES *fill out* and become perfectly straight. They thus press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the GATES VULCO ROPE—and this means *longer* belt *life* and *lower* belt *cost* for you!

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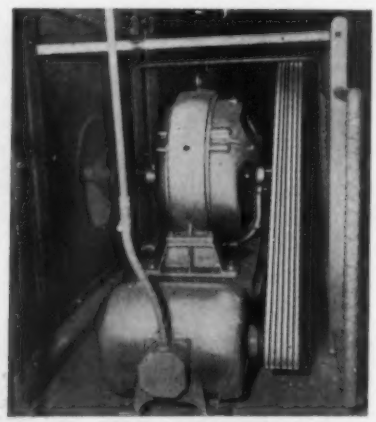

Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

CS-548

MULTI-PURPOSE LOADERS SAVE MONEY

Examples of many uses for Eimco 105 Tractors with excavating attachments are sent in by Eimco's field engineers. The customer buys his Eimco for loading but usually finds that it also performs many additional jobs that make the 105 pay for itself quickly in bonus work.

The picture above shows an Eimco high discharge excavator attachment on an Eimco 105 Tractor loading into an ore bin. The owner decided he could save time by cutting a new road into his pit and found the 105 could cut its own road.

Many other Eimco 105 owners are finding them ideal for ripping up old curbs and paving, tearing out old foundations, digging ditches, basements, patching highways and many other jobs in the heat of the desert or the cold of the Yukon — Eimcos are tops on any job anywhere.

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Eimco 105

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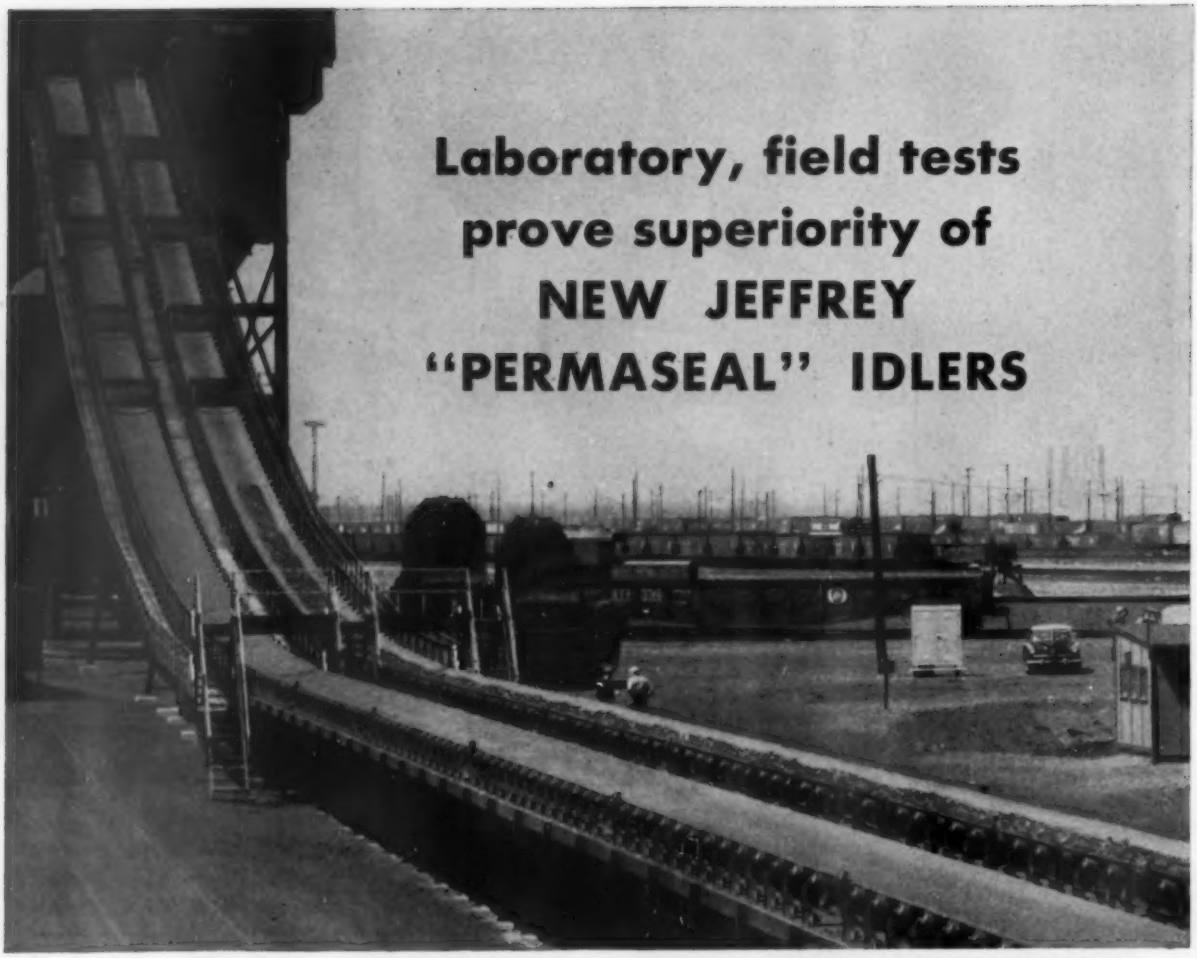


Laboratory, field tests prove superiority of NEW JEFFREY "PERMASEAL" IDLERS

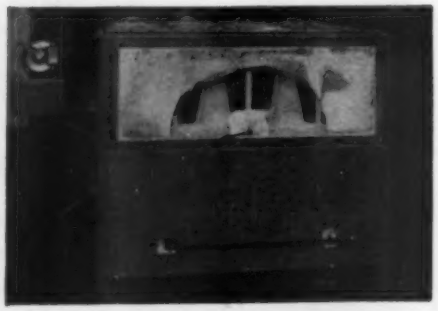
The new double flexible seals on Jeffrey PERMASEAL Belt Idlers are hailed as the greatest advance in conveying engineering in the last 20 years.

Laboratory and field tests have proved these flexible contact seals keep dirt out and grease in *for the life of the idler*. These seals have been tested with outstanding results under greatly accelerated conditions of wet sand, dry sand and airborne dust in our Research Laboratory. Field tests (such as the large installation above) are demonstrating the merits of PERMASEAL idlers in conveying iron ore, coal, stone and foundry sand.

Jeffrey PERMASEAL Belt Idlers with new double flexible seals are available in all types and sizes. They will vastly improve your complete conveyor operations.

WRITE FOR TECHNICAL INFORMATION AND ESTIMATES

Above: Installation of Jeffrey PERMASEAL Belt Idlers at the Pennsylvania Railroad's new Philadelphia ore dock. Twin 54" belts convey an ultimate capacity of 10,800 TPH. Each belt travels 80' to top of terminal house at rate of 500 FPM.



Airborne-dust test in Jeffrey Research Laboratory (unretouched).

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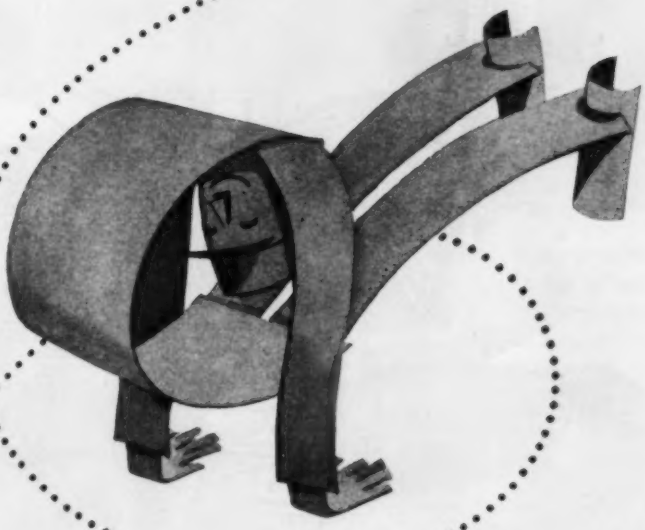

ALBEMARLE'S Multiwall Bag operation is, in many ways, as flexible as its Trade Figure! That is because Albemarle is a completely integrated mill . . . growing its own pulp wood, milling, coloring and printing its own stout Kraft paper, making its own plain and valved, pasted and sewn Multiwall bags in many plies.

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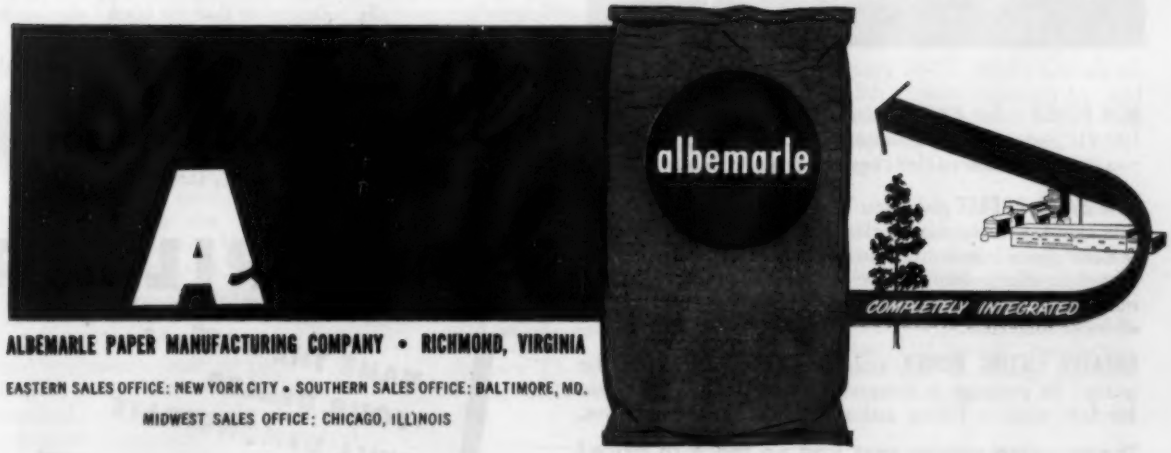

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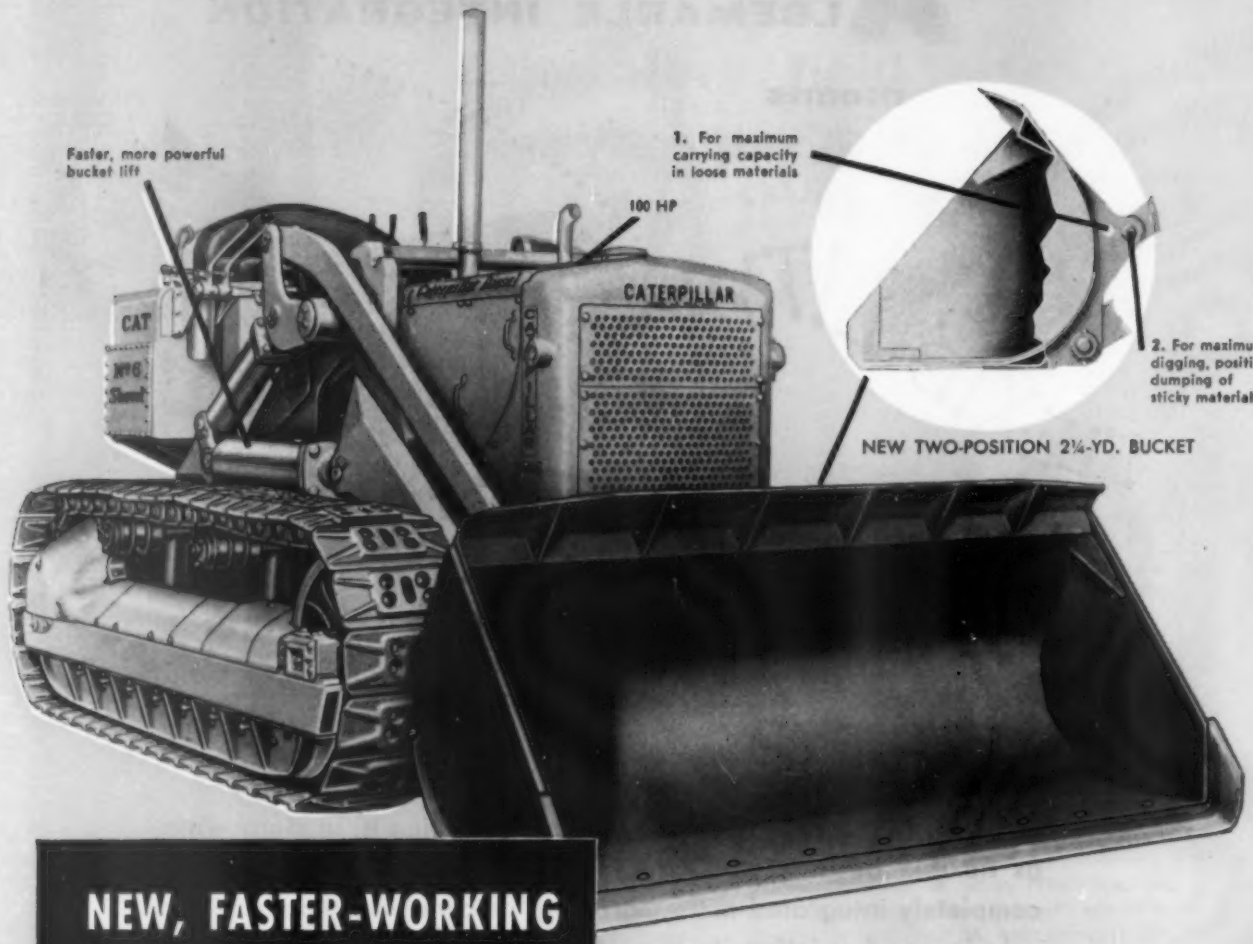
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NEW TWO-POSITION 2¼-YD. BUCKET

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news of the industry

PIT AND QUARRY

Petoskey Portland Cement Acquired by Penn-Dixie—Adds 1,600,000 Bbl. Yearly

Purchase of the Petoskey Portland Cement Company and Petoskey Transportation Company of Petoskey, Mich., by Penn-Dixie Cement Corporation was announced recently by B. W. Druckenmiller, Penn-Dixie president. The acquisition will add approximately 1,600,000 barrels of cement annually to Penn-Dixie's present (eight plant) output of about 11,300,000 barrels.

A plant modernization and expansion program estimated to cost in the neighborhood of $1,000,000 will be started immediately, according to Mr. Druckenmiller. This will include the installation of new crushing equipment, coolers, and other installations in the quarries. The Michigan companies will now operate under the Penn-Dixie name.

Mr. Druckenmiller stated that Penn-Dixie had acquired more than 90 percent of the outstanding common stock of both Petoskey companies at $20 a share. The cement company had 250,000 shares outstanding and the transportation company 57,711. He indicated that Penn-Dixie is continuing the same offer to the holders of the less than 10 percent of the stock who have not yet sold their Petoskey holdings.

Industrial Hygiene Leaders To Meet Nov. 17-18 at Pittsburgh

Potential industrial health hazards, as well as the major health problems now facing the manufacturer, will be taken up at the 19th Annual Meeting of Industrial Hygiene Foundation to be held at Mellon Institute, Pittsburgh, Pa., on November 17 and 18.

Some 800 leaders in the industries and professions from all parts of the United States will participate in medical, engineering, chemical-toxicological, legal and joint medical-legal conferences on the first day and in the main meeting, designed particularly for management, on the 18th. They will represent the 360 member firms of the Foundation.

Great Lakes Carbon Adds Four New Perlite Franchisees

The following four firms have signed new franchise agreements with the Great Lakes Carbon Corporation to market Permalite: Gregg Products Company, Grand Rapids, Mich.; Buffalo Perlite Corporation, Buffalo, N.Y.; Perlite Industries, Reg'd., Pierre, Quebec, Can.; and Perlite Products, Ltd., Winnipeg, Manitoba, Can.

Addition of these four new franchisees brings to 23 the number of producers in the Permalite group.

Ideal to Make Aggregate At Laramie Alumina Plant Acquired from Government

Cris Dobbins, president of the Ideal Cement Company, has announced that his firm recently purchased for $1,200,000 the Federal Government's experimental alumina plant at Laramie, Wyo. Mr. Dobbins stated that the production of lightweight aggregate for concrete would be started at the plant this fall. According to General Services Administration sources, Ideal's bid was the only one meeting their specifications.

It was indicated that the aggregate will be sold in Utah, Wyoming, Colorado, Nebraska, and possibly Minnesota. Raw material is clay from deposits near Laramie.

Coming Events

November 17-18, 1954—Pittsburgh. 19th annual meeting, Industrial Hygiene Foundation, Mellon Institute.

December 2-3, 1954—Cincinnati. Annual operators meeting, National Slag Association, Netherland Plaza.

January 9-13, 1955—Miami. 39th annual convention, National Sand and Gravel Association and 25th annual convention, National Ready Mixed Concrete Association. Miami Municipal Auditorium.

January 10-13, 1955—New Orleans. Annual meeting and exhibit, American Road Builders Assn. Roosevelt Hotel.

January 17-18, 1955—Washington, D.C. Annual convention, National Agricultural Limestone Institute, Inc. Statler Hotel.

January 23-27, 1955—Chicago. 36th annual meeting, Associated Equipment Distributors. Conrad Hilton Hotel.

January 24-27, 1955—Cleveland. 35th annual convention and exhibit, National Concrete Masonry Association. Cleveland Public Auditorium.

February 7-9, 1955—Cincinnati. 38th annual convention, National Crushed Stone Association. Netherland Plaza Hotel.

February 21-24, 1955—Milwaukee. 51st annual convention, American Concrete Institute. Hotel Schroeder.

September Building Totals Set All-Time Sept. High In 37 Eastern States

New high records were set in September for future construction in the 37 eastern states, according to the F. W. Dodge Corporation.

The September total of $1,816,232,000 rounded out the biggest nine-month total of Dodge's 63-year history, 13 percent ahead of the first nine months of 1953, which until now was the all-time high.

The September total was 4 percent above that of September, 1953, and set an all-time September high. Eliminating last year's atomic energy contracts of September, it was 20 percent ahead of September, 1953.

The nine-month total of $14,477,181,000 was $1,620,000,000 ahead of the first nine months of last year.

Nine-month categories compared with a like period in 1953 were as follows: nonresidential, $5,246,897,000, up 4 percent; residential, $6,196,199,000, up 26 percent; heavy engineering, $3,034,085,000, up 5 percent.

September categories follow: nonresidential, $646,825,000, up 17 percent over August, but 17 percent less than September, 1953; residential, $777,332,000, up 12 percent over August and 53 percent over September, 1953; heavy engineering, $392,075,000, up 19 percent over August, but 13 percent below September, 1953.

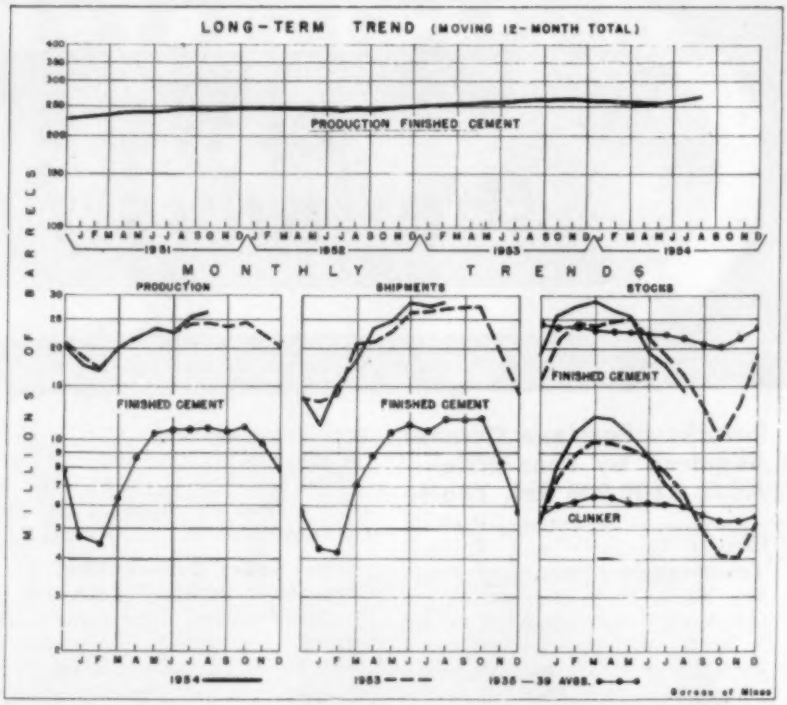
Second Big Cement Operation In Alberta to Open in 1956

A multi-million-dollar portland cement industry will be established in the Edmonton, Alberta, district with European financial backing. The facilities are to be in operation by 1956, Premier Manning's office announced.

La Societe Generale de Belgique of Brussels will build the plant, which is to be managed by Roger Jeanty of Montreal.

This plant would use raw materials from limestone deposits in the Cadomin area, 160 miles southwest of Edmonton. The only other cement plant in Alberta is operated by the Canada Cement Company at Exshaw, near Calgary.

Public-spirited action on the part of the Limestone Products Corporation of America in Sparta, N.J., took an unusual turn when this company inserted an ad in a Newark newspaper offering pure springwater from its quarry to all needing it. This welcome offer was quickly accepted by local farmers during a season of drought.



SUMMARY—Production of finished portland cement in August, 1954, totaled 25,681,000 barrels, as reported to the U.S. Bureau of Mines—a 6 percent increase from the August, 1953, figure. Mill shipments totaled 28,802,000 barrels—6 percent more than in August, 1953, while stocks of 14,329,000 barrels at the end of the month were 13 percent less than on the same date a year ago. Clinker production during the month totaled 24,626,000 barrels—an increase of 5 percent from the August, 1953, total.

PRODUCTION—One hundred and fifty-seven (157) plants located in 37 states and Puerto Rico reported a production of 25,681,000 barrels of finished portland cement during the month, compared to 156 plants which manufactured 24,289,000 barrels in August, 1953. Clinker production during the month was 24,626,000 barrels, as compared to 23,370,000 barrels during the previous August.

SHIPMENTS—Mill shipments of finished portland cement were 6 percent higher than in August, 1953, and totaled 28,802,000 barrels. Shipments were higher in 15 districts and lower in 5 districts, as compared to shipments in August, 1953. Largest percentage gains were recorded in the Texas, New York-Maine, Virginia-Georgia-Florida-Louisiana-South Carolina-Mississippi, Tennessee, and Colorado-Arizona-Wyoming-Montana-Utah-Idaho districts. Cumulative figures for the first eight months of the year show largest increases in shipments in the eastern Missouri-Minnesota-South Dakota, Texas, Virginia-Georgia-Florida-Louisiana-South Carolina-Mississippi, Colorado-Arizona-Wyoming-Montana-Utah-Idaho, and Michigan districts, while the principal decreases were in the New York-Maine, and northern California districts.

Florida Plant Operators Move to Prevent Sabotage

Mutual protection against vicious damage to plants is the purpose of an association formed by several sand and gravel and ready-mix concerns in Dade and Broward counties, according to word from Paul Jacobs, treasurer of the Acme Concrete Corporation, Miami, Fla.

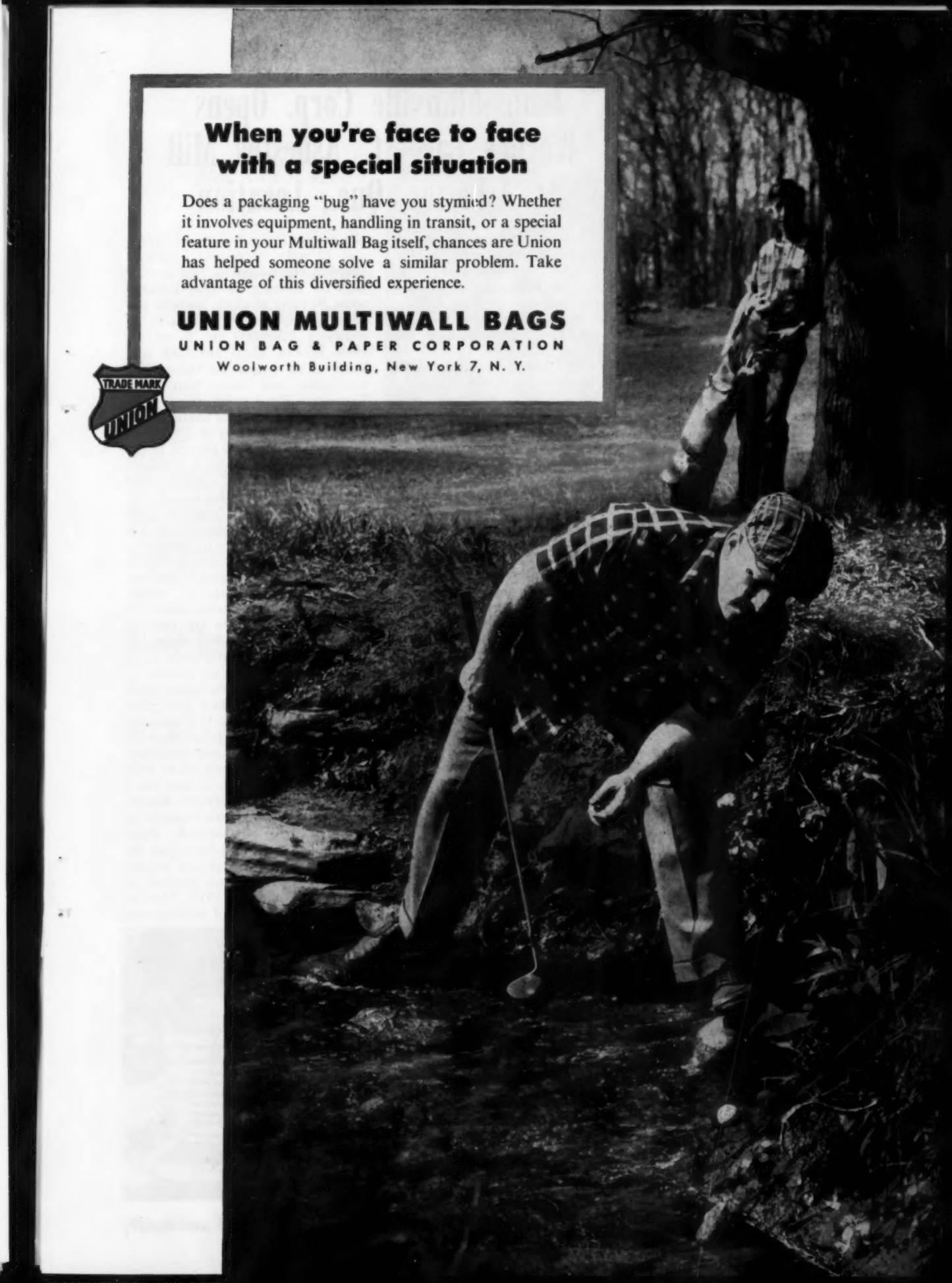
This organization was launched to guard against a recurrence of incidents such as the dynamiting and destruction of Acme's big mixer at its Hialeah plant on August 30. The explosion caused damage estimated between $30,000 and $40,000, Mr. Jacobs stated.

The protective association has authorized the payment of a $5,000 reward for "information leading directly to the arrest and conviction of the person or persons responsible for the blast," and a similar offer was made for leads in the apprehension of persons planning future acts of sabotage.

H. B. Plunkett Appointed To A. P. Green Firebrick Post

H. B. Plunkett has been elected to the newly-formed post of executive vice-president of the A. P. Green Fire Brick Company, Mexico, Mo. He was formerly a vice-president and also served as vice-president and manager of domestic and Canadian affiliate companies. Mr. Plunkett has been with the firm for 35 years.

He is presently serving as chairman of the Mellon Institute Committee, which controls the research program of The Refractories Institute.



When you're face to face with a special situation

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TRADE MARK UNION

Johns-Manville Corp. Opens "World's Largest" Asbestos Mill At Asbestos, Que., Location

Mine shaft head frame on one of the two underground mine shafts at the Jeffrey mine of Johns-Manville Corp., one of the largest asbestos mines in the world.

JOHNS-MANVILLE Corporation started production in its new asbestos mill at Asbestos, Quebec, Canada, on September 30, 1954. More than one-third of the free world's supply of asbestos fibre will be milled in this "world's largest and most modern project in the asbestos industry". The project is a part of the $70,000,000 program of expansion and development of new mines, mills, and equipment undertaken by the company in the last few years.

According to L. M. Cassidy, chairman of the board of J-M, the new Jeffrey mill will replace the ones existing at this location and provide more modern facilities with increased production capacity at lower operating cost. Half of the new mill will go to work immediately. A total production of 625,000 tons annually will be available by the spring of 1956. The new mill will draw on asbestos ore reserves from the adjacent Jeffrey mine, long known as the largest asbestos mine in the world, the supply estimated to be sufficient for more than 100 years of operation.

The plant is located on 60 acres of land. The main structure has 235,000 sq. ft. of floor. It is 225 ft. wide and 1,040 ft. long, the walls being mainly of steel-sashed window area, affording the maximum light for daytime operation.

The new mill occupies a 14-story, steel-frame-and-concrete building having 972,000 sq. ft. (22 acres) of floor space. The first half of the 432,-by 330-ft. building is now completed, and 25 percent of the machinery is in place. Thirty thousand cu. yd. of concrete went into its construction. The exterior is asbestos-cement "Transite" sheathing, a material fitting well into the modern architectunral design followed in the structure. Within, it is equipped with correspondingly modern lighting, safety devices, and dust control apparatus to provide the safest and healthiest working conditions for the 2,600 men and women expected to be employed in 1956 in the mine, mill, and plant operations.

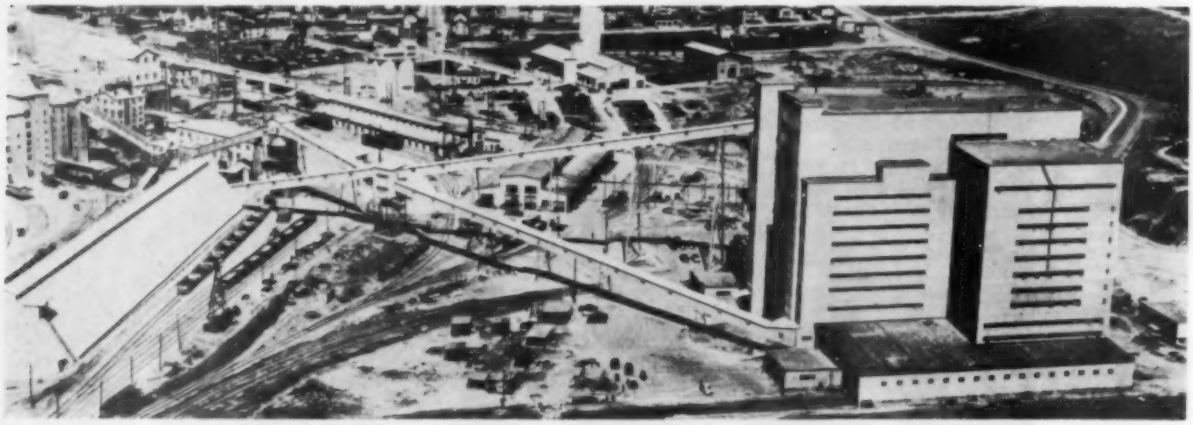
In a preview of the intricate detail of the equipment necessary to provide these conditions, it is interesting to relate that in the mill there are 4,000 separate dust enclosures, utilizing 4 miles of piping and 12 miles of control wiring in the dust control system. To provide bags for filtering the dust required some 30 acres of cloth, and the air-handling equipment is capable of purifying 2,500,000 cu. ft. of air every minute. There are 5,000 separate safety guards on the milling equipment and more than 4,600 fluorescent lighting fixtures.

There are two mine shafts in the underground workings of the Jeffrey mine, where about 72 percent of the total asbestos ore output is produced by the "block-cave" underground method. A shaft is sunk outside the main ore body to a depth of 1,000 ft., and horizontal tunnels are cut into the ore body from it, permitting undercutting of the ore in blocks 200 ft. by 200 ft. square. There are approximately 30 miles of tunnels in the Jeffrey mine, from which ore is removed by rail to the primary crushers more than 800 ft. underground. After this reduction it is hoisted to the surface for milling.

The present manufacturing plant at Asbestos was the first J-M plant to be built in Canada. It is operated by the Canadian Johns-Manville Co., Ltd., a wholly-owned subsidiary. The plant was first erected in 1924 and enlarged in 1948. It now has 9 production and 10 service departments and a production capacity of approximately 30 carloads daily.

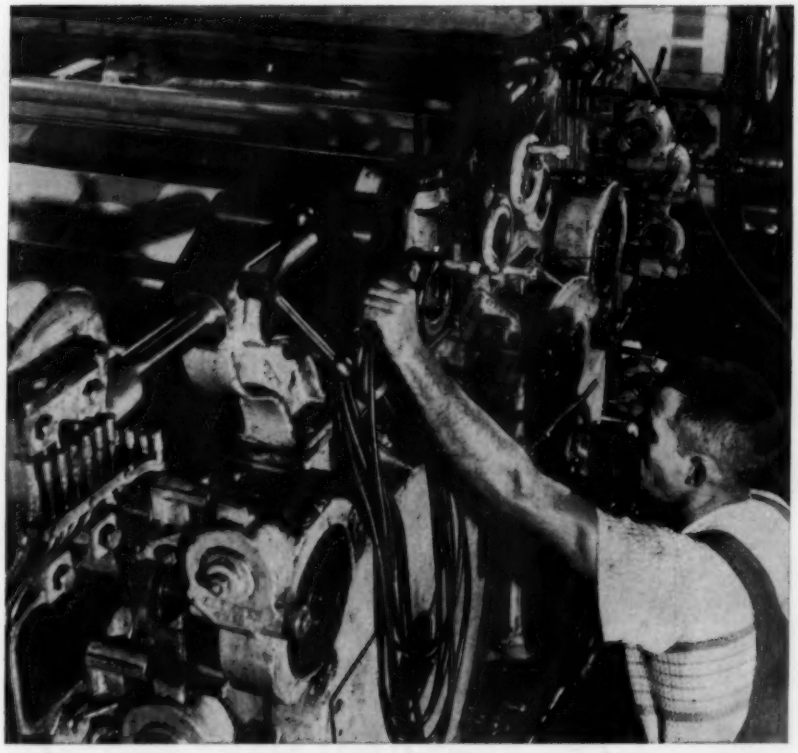
Paralleling the ever-increasing demand, J-M undertook an expansion and modernization program at the Jeffrey mine in 1945. This included the initiation of underground

Aerial view of the new Johns-Manville mill at Asbestos, Que., Canada. Other mining and milling facilities are shown in the background. At left is the 60,000-ton capacity dry rock storage building, and at the right the new mill, scheduled to be completed early in 1956.



No. 3 of a series

How Bemis makes GOOD multiwall bags for you



As with other types of printing, there is no substitute for experience in multiwall paper bag printing. A typical Bemis pressman is Wesley Pitcher, shown here at the 4-color press he operates at the Bemis plant in Peoria. Wesley went to work in the printing department 21 years ago and has been a pressman for 18 years.

Good bag printing requires *three* things . . . and Bemis has 'em!

Good multiwall bag printing . . . the kind that makes your brand a star salesman . . . requires good presses, good plates and good workmen. *And Bemis has 'em!*

1. Specially designed presses . . . with features needed for *best multiwall printing* . . . are used.

2. Our own skilled, experienced plate makers make our printing plates . . . so we control quality every inch of the way.

3. Since we have been making and printing quality multiwalls for twenty-seven years, we have trained our pressmen to the point that they do, day in and day out, the best printing in the bag industry.

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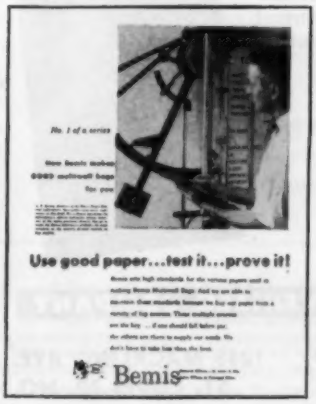
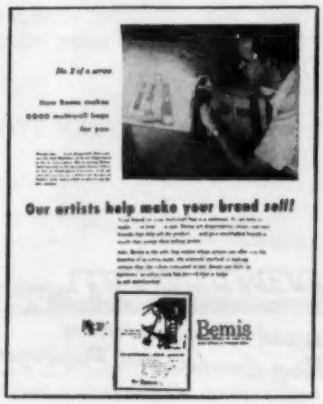
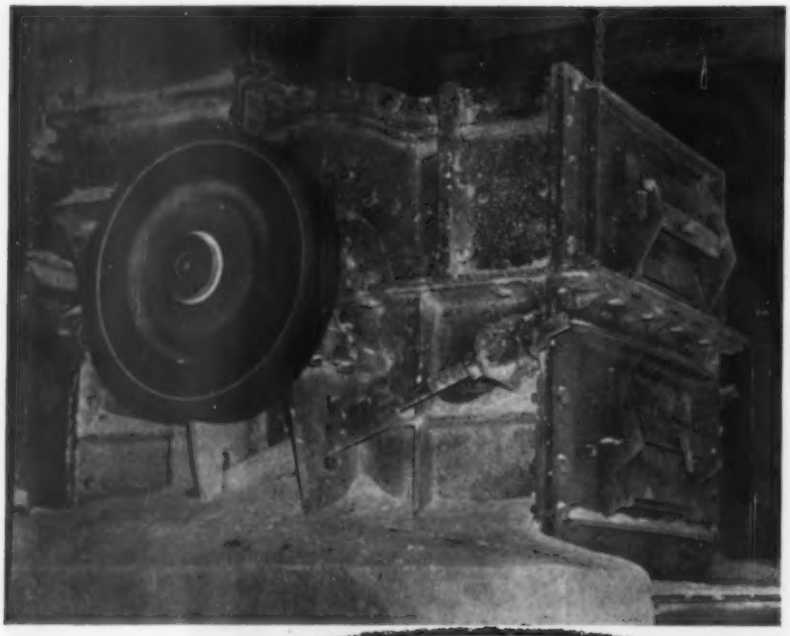
Sales Offices in Principal Cities







1,150,000 TONS OF STONE CRUSHED WITH A PARTS-DISPLACEMENT COST OF ONLY 1/3¢ PER TON

AMERICAN ACS-4 HAMMERMILL at Missouri Quarry gives proof of BUILT-IN QUALITY

At a large Missouri Quarry, this rugged American Hammermill keeps parts-replacement — and stone crushing costs — down to a minimum.

That's because Americans are built to last — with heat treated alloy steel main rotor shaft . . . heavy-duty Timken Bearings enclosed in dust and oil-tight pillow blocks . . . heavily ribbed sectional frame for vibration-free operation and easy accessibility and adjustability . . . all-manganese steel crushing parts for longer wear.

From agstone to roadstone sizing, Americans offer the flexibility and consistent sizing control that make every reduction job more efficient as well as more profitable.

SEND for your copy of "BETTER STONE CRUSHING"

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1245 MACKLIND AVE.
ST. LOUIS 10, MO.

mining operations, which will eventually replace open-pit mining, a method which now has become impracticable. In 1953 the mine produced 481,000 tons (more than 15,000 carloads), representing 56 percent of the Canadian production. With the new mill in operation this figure will be considerably increased.

Westvaco Enlarges Reserves By Acquiring Utah Deposits

Westvaco Mineral Products Division, Food Machinery & Chemical Corporation, New York, has acquired extensive deposits of high-grade phosphate rock and shale in Rich County, Utah, according to an announcement by W. N. Williams, president. Economic evaluation and exploratory development work leading to this acquisition was done by Westvaco's Mineral Development Department under the direction of O. A. Powers at Pocatello, Idaho.

Westvaco currently operates four large electric furnaces at Pocatello, Idaho, for the production of elemental phosphorus from shale rock deposits on the nearby Fort Hall Indian Reservation and has substantial phosphate rock reserves in that area. The newly acquired property gives Westvaco two of America's largest unworked phosphate rock and shale deposits and provides reserves sufficient to assure continued operation of Westvaco's phosphorus furnaces for decades to come.

• The cover photo this month shows the unusual pit operations of the Hamlin Sand and Gravel Company at Flattop, near Hamlin, Tex. This new 300-t.p.h. plant was described in the August, 1954, issue of Pit and Quarry (p. 51). Two draglines are used in the cut-and-fill operation, and cuts average 20 ft. wide by 500 ft. long. One dragline casts the 4½-ft. overburden into the adjacent cut, from which the gravel has been removed, while the other loads the gravel into trucks for haulage to the plant.

TELSMITH design and equipment

...meet all deposit and market conditions

TELSMITH Style S Gyrasphere Crusher

TELSMITH Super-Scrubber and Vibro-King Screen

TELSMITH Sand Classifier and Sand Drag

● **Carl Stander,** well known Ohio asphalt man and owner of the Fredericktown Sand & Gravel Co. plant at Fredericktown, Ohio, had many pit and plant problems. Telsmith design and equipment solved them; thanks to an excellent job done by a Telsmith Super-Scrubber and other Telsmith equipment.

This plant produces about 125 to 175 tons per hour—making 4 sizes of gravel and 2 grades of sand at any one time, all meeting Ohio State specifications for asphalt and concrete. In freezing weather, the full crushing capacity of Telsmith Jaw and Gyrasphere Crushers is used to make minus ¾" crusher-run without operating the washing plant.

Here again Telsmith modern design and equipment produce low cost, quality aggregate. *Get Bulletin* 266. G-23

TELSMITH
Equipment in this Plant

Two 30"x5'6" Standard Plate Feeders
5'x10' Double Deck Scalper Screen
4' x 12' Double Deck Vibro-King Screen
36 S Gyrasphere Crusher
30"x25' Single Screw Sand Classifier
72"x10½' Super-Scrubber
48"x30' Sand Drag
Four 45 yd. Steel Bins
Five Telsmith BG Belt Conveyors, 24" and 18" wide, total length about 525'

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Marens Eqpt. Co., New Hudson, Mich. • Rish Eqpt. Co., Cincinnati 14, & Portsmouth, Ohio—Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. Robert S. Bailey, 816 W. 5th St., Los Angeles 17, Calif. • Mines Eng. & Eqpt. Co., San Francisco 4, Calif. • Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash.

So. Calif. Associations Honor Ahearn, Murphy At Industry Dinner

On the evening of September 20, 1954, the Southern California Rock Products Association and the Southern California Ready Mixed Concrete Association were hosts at an Industry Dinner at the Biltmore Hotel, Los Angeles, to the members of the industry from New Mexico, Nevada, Arizona, and from the California counties of Kern, Riverside, San Bernardino, Ventura, Orange and San Diego. The dinner was given in honor of John W. Murphy (Union Sand and Gravel Co., Spokane, Wash.), who is president of the National Sand and Gravel Association, and of Vincent P. Ahearn, executive secretary of the National Sand and Gravel Association and the National Ready Mixed Concrete Association. More than two hundred persons attended the dinner.

Harold E. Bender (Azusa Rock & Sand Co., Azusa, Calif.), president of the Southern California Rock Products Association, introduced the group's vice-president, Robert Mitchell (Consolidated Rock Products Co., Los Angeles), who acted as the master of ceremonies. Mr. Mitchell then introduced the out of town guests of the industry and the members of the two local associations.

In introducing John W. Murphy, Mr. Mitchell spoke of the great work that Mr. Murphy is doing for the rock, sand and gravel industry throughout the United States and the amount of effort and personal time he is devoting to this work. In Mr. Murphy's address, he outlined the various phases of association work which is being done through the work of the staff and officers of the N.S.G.A. He then told of the new problems which are facing the industry in the matter of zoning and the diminishing supplies of available raw material. Mr. Murphy cited the necessity for competent engineering research in the setting up of natural resources areas so that the people of this nation might continue to be able to secure aggregates for the future construction of homes and public improvements.

Mr. Ahearn talked to the audience most interestingly on such industry problems as percentage depletion and labor. He described the Washington picture at the present time and gave his opinions of the possibilities of important coming events.

Death of Otho M. Graves Is Loss to Entire Industry

Otho M. Graves, 72, chairman of the board of General Crushed Stone Company, died in a hospital at Easton, Pa., on October 15 after a brief illness. Until recently, he also was chairman of the board of Buffalo Crushed Stone Corporation, Buffalo, N.Y.

Otho M. Graves

Mr. Graves had been associated with General since 1918, serving successively as assistant to the president, vice-president and general manager, and president. He was considered an authority on seismographic testing in quarry blasting. One of the founders of the National Crushed Stone Association, he had served for four years as its president. Mr. Graves was also a director of the National Association of Manufacturers, a member of the National Safety Council, and a consultant to and member of the U.S. Bureau of Mines.

Following his graduation from Tufts College, Medford, Mass., with a degree of bachelor of science, Mr. Graves followed the profession of civil engineering and taught at the University of Pennsylvania and later at Dartmouth College. In 1913 he joined the faculty of Lafayette College, where he remained until he joined General Crushed Stone in 1918.

Southern California Rock Products Association
Southern California Ready Mixed Concrete Association
Industry Dinner in Honor of,
John W. Murphy, PRESIDENT NATIONAL SAND & GRAVEL ASSOCIATION
Vincent P. Ahearn, EXECUTIVE SECRETARY NATIONAL SAND & GRAVEL

● Banquet given by the Southern California Rock Products Assn. and the Southern California Ready Mixed Concrete Assn., to honor J. W. Murphy and Vincent P. Ahearn.

SMOOTH SCREENING CALLS FOR SECO VIBRATING SCREENS

Photographed on the job, Materials Service, Inc., Windsor Locks, Conn.

And Smooth Screening Pays Off in Better Sizing and Less Maintenance

Talk with operators about vibrating screen requirements and one thing seems to stand out every time: to be a *good performer* . . . a vibrating screen must be a *smooth performer!*

It's simply common sense . . . you want accurate sizing . . . you want maximum tonnages . . . and you want trouble-free performance . . . especially during peak production season.

Talk with operators who have SECO screens on their jobs . . . you'll learn why you'll be money ahead with smooth operating SECO vibrating screens on your job. What's the secret? Fully-controlled true circular action . . . and *only* SECO has it . . . thanks to the patented equalizer assembly.

SECO

TRUE CIRCULAR ACTION

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SMOOTH OPERATING SECOS FOR EVERY SCREENING JOB

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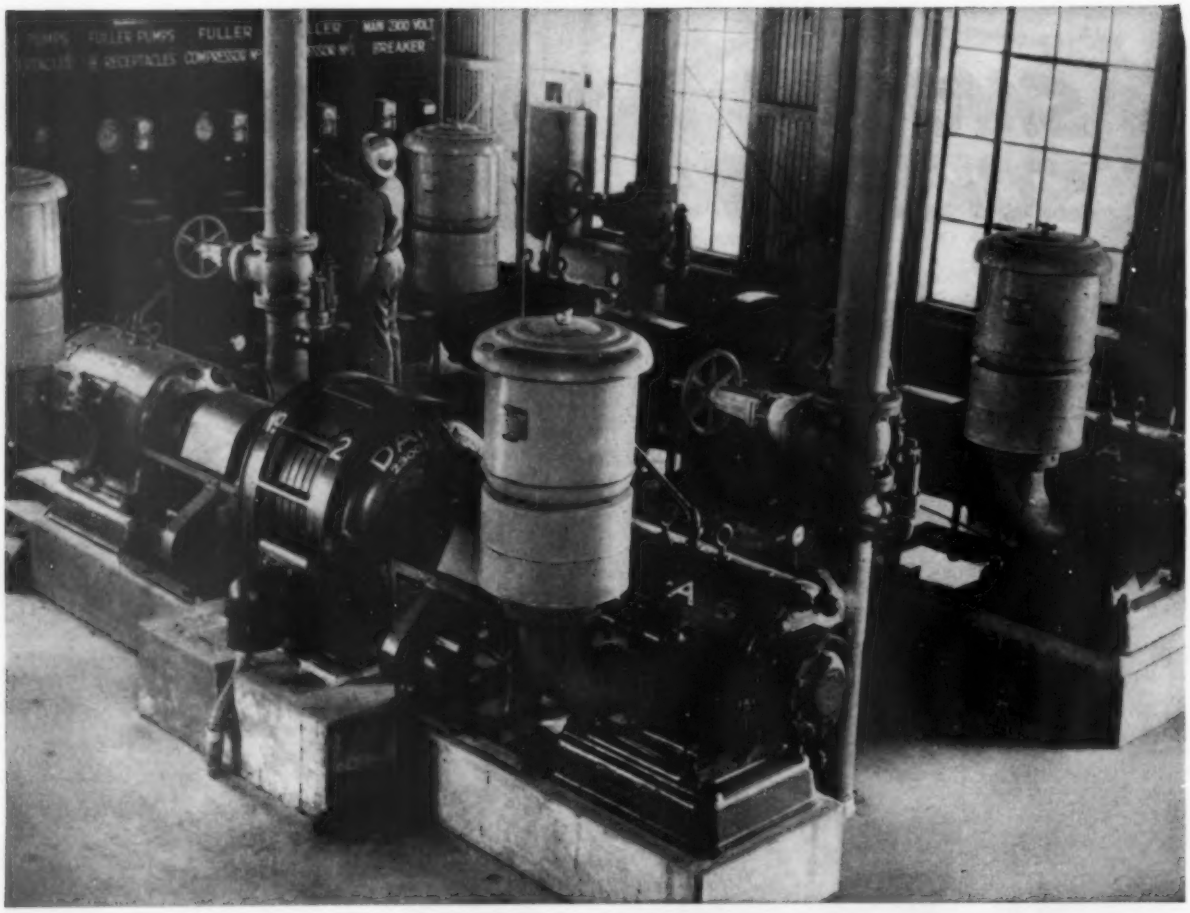
BUFFALO 25, N. Y.



Fuller Rotary Compressors operate with minimum maintenance cost

Fuller Rotary Compressors installed in the Permanente Cement Company's bulk-cement storage and ship-loading plant at Redwood City, California, do yeoman duty supplying air to the Fuller-Kinyon Conveying System installed in the plant. These two Fullers, illustrated above, are of the single-stage duplex type, each having a capacity of 2040 c.f.m., actual free-air delivery, with 40-lb. discharge pressure.

These compressors are kept busy. During the year 1953, the Redwood City plant shipped approximately 2-3/4 million barrels of cement; however, the Fuller Rotary Compressors supplied the air to the Fuller-Kinyon System for handling it twice—incoming to storage and outgoing from storage to ships—for a total volume of approximately 5-1/2 million barrels. And, this mammoth task was accomplished with a total maintenance cost of only $130.00 for both machines!

Such operation is the result of two important factors: (1) equipment designed and built to give satisfactory service under all kinds of working conditions; (2) careful overall supervision of the equipment, and good housekeeping by the operating personnel in the plant.

In this operation it is highly essential that these compressors operate at the highest efficiency when ships are being loaded, because wharfage charge is $2.00 for every minute the ship is tied up to the wharf, in addition to operating cost of the vessel.

Thousands of Fuller Rotary Compressors are operating in various industrial plants, giving unqualified satisfaction and service, day in and day out. They're built in single and two-stage units for capacities to 3300 c.f.m., pressures to 125 pounds. Write for Bulletin C-5A, for a complete description of these modern machines.

Fuller

FULLER COMPANY, Catasauqua, Pa.

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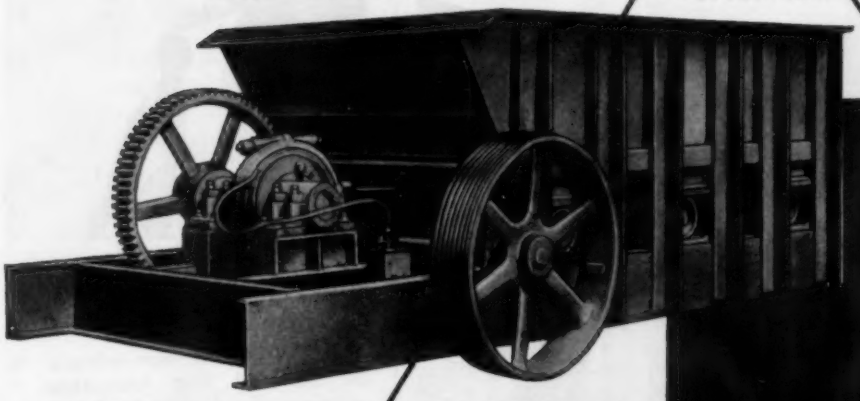
C-257
1170

PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS

A Great Combination..

For Low Cost Handling and Crushing Operations!

A combination of McLanahan Reciprocating Plate Feeder and Rockmaster Crusher is your answer to most economical feeding and crushing of 1000 tons or more of limestone, ore or rock per hour. Equipment can be furnished as component parts or as separate units to best suit your application.



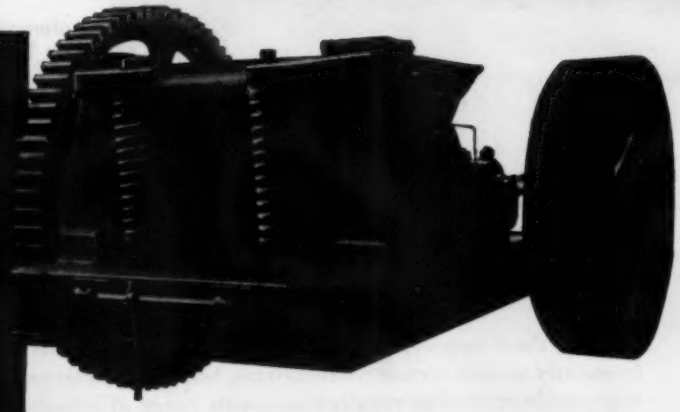
1

Heavy Duty

Built to handle materials from the size of sand to shovel-loaded rock, McLanahan Adjustable Reciprocating Plate Feeders automatically control the rate of flow of material, and are quickly adapted to the producing capacity of any machine.

2

Single Roll



The McLanahan Rockmaster Crusher is the economical solution to most any crushing problems. Greatest savings can be achieved by this combination of equipment. Outstanding for primary and secondary crushing operations, for use on limestone, gypsum, rock, gravel, shale, iron ore, slag and other materials.

Write Today
For Bulletins RM-505 and FRE-4812

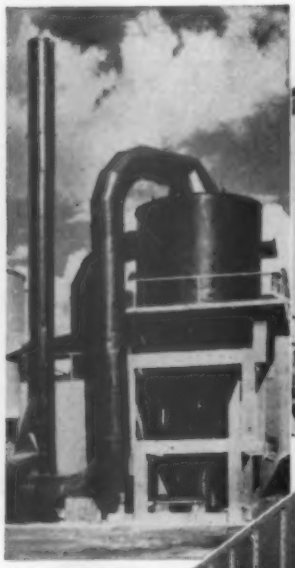
McLANAHAN & STONE CORPORATION
Pit, Mine and Quarry Equipment Headquarters
Hollidaysburg, Pennsylvania

Dependable Products: **Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.**

Norblo

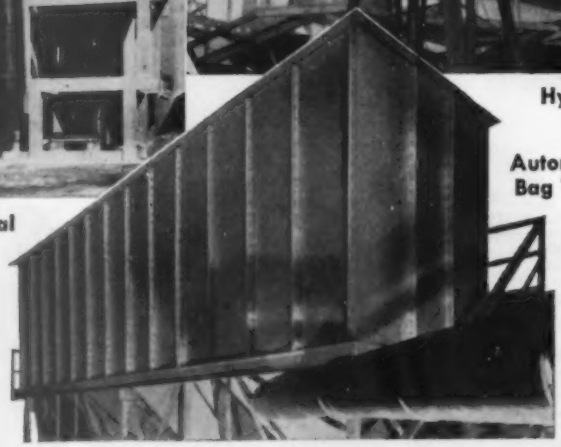
Dust and Fume Collection Systems

make outstanding records for high recovery with low operating and maintenance costs



Centrifugal

Hydraulic



Automatic Bag Type

These three important types of Norblo collecting systems, frequently used in certain combinations, bring you economical, dependable control as required in a wide range of industries. "Guaranteed Efficiency" is not an empty phrase at Norblo. We stand back of every installation that's used for the purpose and at the capacity for which we designed it. All component parts are made by Norblo, under controlled specifications.

For more than 40 years Norblo has engineered and supplied installations of every size in the rock products, smelting, chemical, metal working, milling and processing fields. It pays you to get the facts about Norblo Dust and Fume Collecting Systems. Give us a description of your problems.

The Northern Blower Company

Engineered Dust Collection Systems for All Industries

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Fred Hubbard

Hubbard to Represent U.S.A. At International Slag Meeting

Fred Hubbard was selected by the National Slag Association to represent the United States at the International Conference on Utilization of Blast Furnace Slag held October 19-22 in Brussels, Belgium.

Mr. Hubbard's paper, entitled *Production and Utilization of Iron Blast Furnace Slag in the United States of America,* was presented on October 20.

He has been identified with the slag industry for many years as N.S.A.'s director of research, and is an authority on the use of blast furnace slag as a mineral aggregate.

Marquette Wins 10th Award For Best Annual Report

For the tenth consecutive year Marquette Cement Manufacturing Company has won the bronze "Oscar of Industry" trophy for excellence in annual reporting, as announced by the *Financial World's* annual report committee. The award was presented at the annual awards banquet in New York on October 25.

A total of 5,000 annual reports were judged by an independent board in 100 industrial classifications for the best-of-industry prize. In the cement industry category, Permanente Cement Company was runner-up for top honors, and Hercules Cement Corporation placed third.

Weston Smith, originator and director of the annual report surveys, presented the trophies at the banquet, which was attended by 1,400 executives from the United States and Canada.

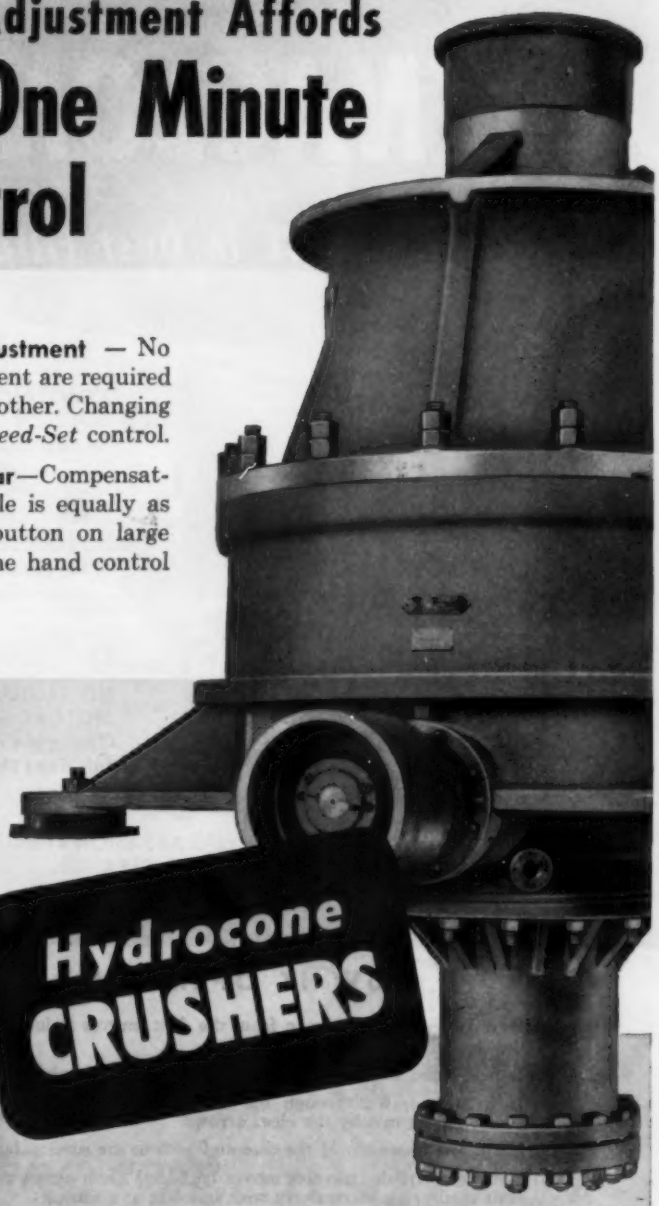
Speed-Set Hydraulic Adjustment Affords

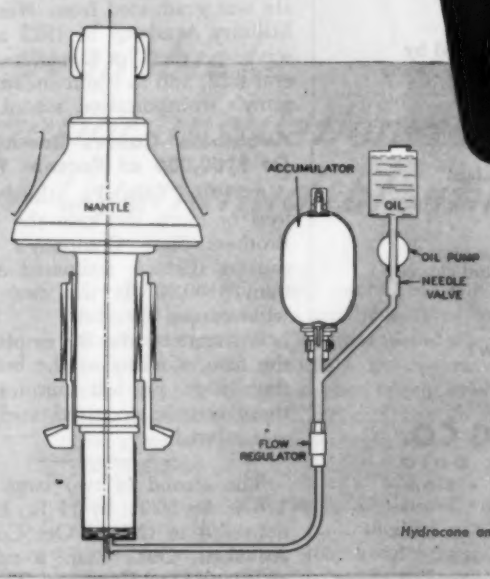
One Man...One Minute Product Control

Quick, Accurate Product Size Adjustment — No dismantling and no auxiliary equipment are required to change from one product size to another. Changing is instantaneous and precise with *Speed-Set* control.

Simplified Compensation for Wear—Compensating for wear on concaves and mantle is equally as fast and convenient. A push of a button on large *Hydrocone* crushers or a move of the hand control on smaller sizes does the job.

Fast Emergency Unloading and Tramp Iron Protection — If crusher stops abruptly because of power failure or other emergency, *Speed-Set* control facilitates fast clearing of crushing chamber.





How Speed-Set Control Works

Mainshaft assembly is supported on hydraulic jack. Oil pumped into or out of jack raises or lowers crushing mantle.

When tramp iron enters crushing chamber, oil from jack is forced into accumulator, allowing mantle to lower. Automatic reset returns cone to original setting after tramp material is passed.

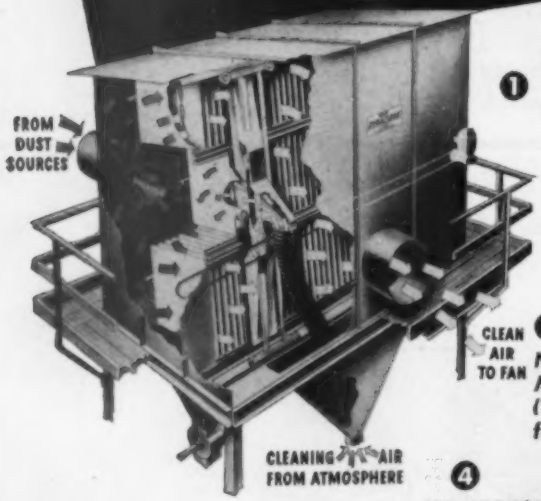
For complete information, see your A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 07B7145B.

A-4478

Hydrocone and Speed-Set are Allis-Chalmers trademarks.

ALLIS-CHALMERS

THE
DYNACLONE
PATENTED
The ULTIMATE in Dust Filters



1. CONSTANT SUCTION at dust sources.
2. SELF CLEANING for continuous operation.
3. NO AUXILIARY MOTORS or BLOWERS (The main operating fan does the cleaning).
4. NO ABRASION of BAGS by the CLEANER.
5. LESS OVERALL HEIGHT and FLOOR SPACE.

HOW IT OPERATES

(a) Dust laden air is drawn in from the dust sources as indicated by the shaded arrows.

(b) It is diffused into the dust chamber by the baffle plate.

(c) It is then drawn through the fabric of the filter bags and is cleaned as shown by the clear arrows.

(d) Clean air passes out of the case and goes to the suction fan.

(e) Concurrently, the traveler moves back and forth across the dust wall registering successively with one bag at a time.

(f) The suction which exists in the dust chamber draws a blast of atmosphereic air through the bag in reverse directions and cleans that bag. (No shaking.)

Control your industrial dust better, for less — with the Sly Dynaclone. May we explain how?

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SLY PIONEERS & LEADERS in INDUSTRIAL DUST CONTROL

Maj. Gen. George Craig Stewart

General Stewart Appointed Safety Council Manager

Major General George Craig Stewart has been appointed general manager of the National Safety Council, a new post created to broaden top-level administration. Expanded activity in highway safety necessitated the creation of this position.

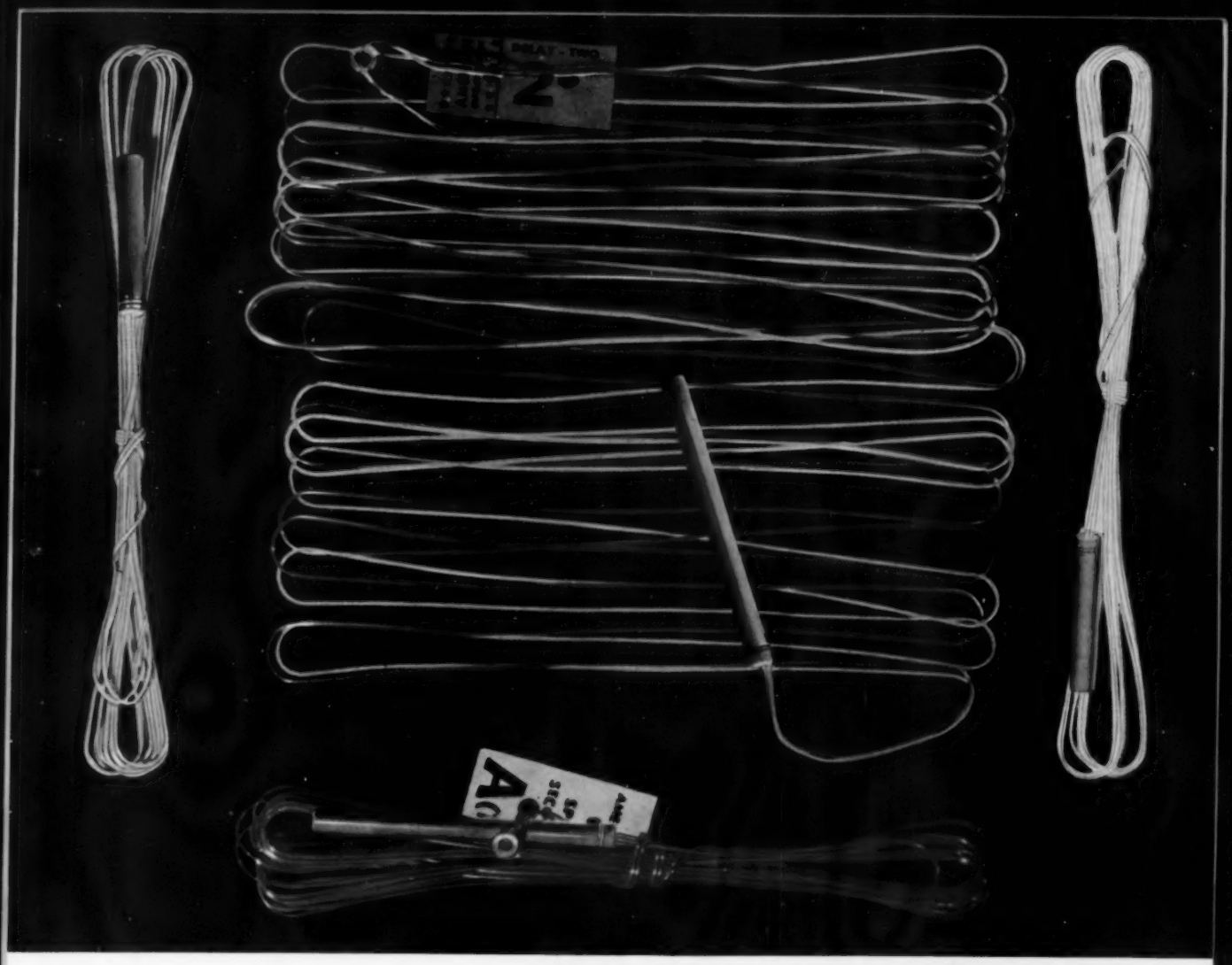
Mr. Stewart assumed his duties after retiring from the army as a major general on October 31, where he was serving as director of the Office of Military Assistance in the Office of the Secretary of Defense. He was graduated from West Point Military Academy in 1923 and has served on the War Department general staff, and as commandant of the army's transportation school.

Avalanche Causes Damage Of $100,000 at Parsons Pit

At Wind Gap, Pa., thousands of tons of earth slid into the Parsons Brothers Slate Company's quarry, causing damage estimated at more than $100,00. It was not learned what caused the slide.

Fortunately, the 85 employees of the firm, working at the bottom of the 250-ft. pit left minutes before the avalanche occurred, and no one was injured.

The second of two large barges, 176 ft. by 50 ft. by 14 ft., has been delivered to Calend Ore Company, Atikokan, Ont., Can., a subsidiary of Inland Steel Company. The barges were built by Construction Aggregates Corporation, Chicago, Ill. Each is powered by a 10,000-hp. motor driving a 36-in. pump.



Now available! Superior insulation featured in new Cyanamid blasting caps

AMERICAN CYANAMID COMPANY
EXPLOSIVES

Cyanamid has for many years been conducting a study of all materials available for blasting cap wire insulation to find one that would offer uniform concentricity—no thin spots. Every type of insulation currently in use has been tested, as have many new materials. Now Cyanamid has an insulation that gives *uniform concentricity*, assures maximum performance!

This new, organosol plastic insulation is applied to wire by a continuous bath method. The wire is dipped in *seven separate baths* and is passed through dies to scrape off excess coating between baths. Each coat is heated to insure perfect set, perfect concentricity. Organosol plastic insulation, because of its uniformity, gives you:

1. **Greater electrical insulation values**
2. **Greater flexibility**
3. **Greater abrasion resistance**
4. **Non-porosity**
5. **Greater moisture resistance**

Capable Field Engineers Are Available At Your Call

HIGH EXPLOSIVES • PERMISSIBLES • BLASTING POWDER
BLASTING ACCESSORIES

Color-Coded for Easy, Sure Identification

Instantaneous, copper wire | Instantaneous, iron wire | Standard Delay | Split Second Delay

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EXPLOSIVES DEPARTMENT

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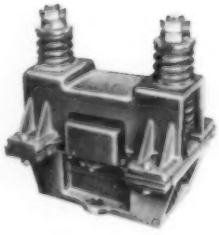
. . assure a positive flow of stubborn materials through bins, hoppers and chutes

They eliminate clogging, arching and plugging of even the most hard-to-move bulk materials. Deliver 3600 powerful, controllable vibrations per minute that assure uninterrupted production on practically any handling system. Easy to install — prevent equipment damage — reduce maintenance.



FINGER-TIP CONTROL — Controlled vibration means a free flow of materials.

NO RODDING & POKING — Flow is continuous without using manual methods.

NO SLEDGING

Write today for complete catalogue data — FREE

SYNTRON COMPANY
385 Carson Avenue — Homer City, Penna.

42nd National Safety Council Congress Held in Chicago

Over 12,000 delegates, from all segments of industry throughout this country and foreign nations, attended the National Safety Council's 42nd annual Congress and Exposition in Chicago during the week of October 18 to 22. The Conrad Hilton Hotel, headquarters for the meeting, housed the exhibits of some 85 firms exhibiting safety equipment. Several other Chicago hotels were hosts to various sections of N.S.C.

The Cement and Quarry Section held its two-day meeting at the La Salle Hotel on October 20 and 21. Nearly 750 speakers were scheduled on a vast variety of subjects pertinent to safety applications and methods.

Papers presented by the following will be summarized in our next issue: M. C. M. Pollard, director of safety of the National Gypsum Co., Buffalo, N. Y., and general chairman of the Cement and Quarry section; Noel S. Symons, Buffalo, N. Y; J. E. Cox Jr., Boston, Mass.; G. A. Borgeson, Hibbing, Minn.; Howard Riefenstahl, Easton, Pa.; and C. W. Farmer, Chicago, Ill. All these papers dealt with interesting aspects of noise control and safe practices in the industries represented by this section.

At the conclusion of the Wednesday session of the Cement and Quarry Section, the election of officers for the 1954-55 executive committee was held, and the following officers were chosen: general chairman, T. W. Jones, production manager, New Haven Trap Rock Co., New Haven, Conn.; first vice-president, Howard Riefenstahl, safety director, Alpha Portland Cement Co., Easton, Pa.; second vice-chairman, Wallace Wing, president, Marblehead Lime Co., Chicago, Ill.; secretary, Kent Jander, National Lime Association, Washington, D. C.; assistant secretary, Kenneth Tobin, National Sand and Gravel Association, Washington, D. C. G. G. Grieve was re-elected staff representative, Cement and Quarry Section, N.S.C., Chicago, Ill. Committee chairmen will be appointed later by the new general chairman.

The Florida State Railroad Commission approved what it estimated to be a 40 to 50 percent reduction in rail freight rates for transportation of cement. The new rates became effective Aug. 30. The Commission also increased the minimum carload from 80,000 to 110,000 lb.

In winter, one-way trip, one-way rigid, reversible trip, and Vee-type Wausau plows can be interchanged quickly with buckets on SHOVELOADER. Plows follow ground contours, through loader's hydraulic float action, getting them right down to the surface. Big 2½ cubic yard coal and snow buckets are available.

Spring, summer, and fall SHOVELOADERS do hundreds of jobs in addition to loading trucks. They are ideal for stripping jobs like this. The full width bucket lets the wheels follow wherever the bucket digs. Operator has full visibility and is located away from moving control arms.

Weight of the SHOVELOADER distributed over a 100-inch wheelbase and 74-inch wheel tread lets it work in soft sugar sand. Low center of gravity and rear wheel oscillation contribute to traction and stability. Four wheel, 3 to 1 planetary reduction drive with big, hi-flotation tires sees it through tough spots like this one.

SHOVELOADER'S long, forward reach (minimum is 3 feet at top of lift fully dumped) spots loads in the center of any hauling equipment used. Its "triple action" bucket lets you pick up heaping loads at every bite. Planetary drive doesn't let drive wheels slip: you get full traction all the time.

4-WHEEL DRIVE SHOVELOADER

master of tough jobs!

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Birmingham Slag Co., Cambria Slag Win Natl. Slag Assn. Safety Contest

Top safety honors in the National Slag Association Safety Competition of 1953, conducted by the U.S. Bureau of Mines, were awarded to the Fairfield Plant No. 5 of the Birmingham Slag Company at Birmingham, Ala., and the Donora Plant of the Cambria Slag Company at Donora, Pa. The two winners of the fifth annual contest, sponsored by the association and conducted by the Bureau, have been awarded bronze plaques, provided by PIT AND QUARRY magazine, and each employee and official at the two plants has been awarded a Certificate of Accomplishment in Safety by the Bureau of Mines in recognition of his part in obtaining outstanding safety records for the operation at which he worked.

Plants Operated 60,000 or More Man-Hours — The Fairfield Plant No. 5 of the Birmingham Slag Company was the winner of the trophy in the large-sized plant group. The winning record was an outstanding accomplishment of being operated 116,365 man-hours without a lost-time injury during the slag year from April 1, 1953, through March 31, 1954. The Fairfield plant entered the association's safety contest in the first year of its inception, 1949, and since then has been worked more than 750,000 man-hours with but eight disabling injuries to its employees. The overall frequency rate at this operation over this period was 10.352 injuries per 1,000,000 man-hours and the severity rate was 8.036 days per 1,000 man-hours. This plant also won top honors in 1951 by virtue of a perfect safety record in a year's work-period amounting to 180,657 man-hours.

Eight other plants in this group had no disabling injuries during the 1953 contest. These plants were ranked from second to ninth place in order of their work-time in man-hours during 1953-54.

Plants Operated Less Than 60,000 Man-Hours —The Donora plant of the Cambria Slag Company was operated 58,921 man-hours without a lost-time injury during the 1953 slag year, and for this outstanding record was awarded the PIT AND QUARRY magazine plaque for winning top honors in this group. This was the fourth year the Donora plant participated in the competition. It was entered in the Association's safety contest in 1949 by its former management, The France Slag Company, and won top honors in 1950 for operating 51,275 man-hours without a disabling injury. In 1952 it was not a contestant. During the four years the plant has been enrolled, it has been worked a period of 213,375 man-hours with one lost-time injury and eight days of resultant disability being charged to it. The over-all frequency rate at this operation during that period was 4.687 injuries per 1,000,000 man-hours and the severity rate was 0.037 per 1,000 man-hours, each rate well below the five-year average of the competition.

Thirteen other plants competing in this group also had injury-free records; however, the Donora plant won top honors, having worked a greater number of man-hours than any other injury-free operation in the group.

Injury-Free Plants — Employees and officials at 23 of the 45 participating plants in the 1953 competition had highly commendable safety records for operating through the period of the contest without a lost-time injury. This was the largest number of injury-free plants in the five-year history of the competition. These 23 plants, or more than 50 percent of the total enrolled, were operated a total of 1,266,973 man-hours or over 41 percent of the 3,077,684 man-hours worked by all competing operations.

In addition to the two trophy winners, Certificates of Accomplishment in Safety were awarded by the Bureau of Mines to the following injury-free slag plants which were operated for the number of man-hours indicated below:

Plant No. 1, The Buffalo Slag Co., Inc., Woodlawn, N. Y., 108,995.

Birmingham Slag plant, United States Pipe and Foundry Co., Sloss-Sheffield Steel and Iron Div., Birmingham, Ala., 107,914.

Steubenville plant, The Standard Slag Co., Steubenville, Ohio, 81,576.

Dock No. 8 plant, The Cleveland Slag Co., Cleveland, Ohio, 75,021.

Birmingham Slag Wool plant, United States Pipe and Foundry Co., Sloss-Sheffield Steel and Iron Div,, Birmingham, Ala., 73,591.

Converter Iron and Lightweight plants, Birmingham Slag Co., Birmingham, Ala., 71,575.

Ashland plant, The Standard Slag and Stone Co., Ashland, Ky., 64,639.

Midland plant, The Midland Slag Co., Midland, Pa., 64,058.

Sharpsville plant, Cambria Slag Co., Sharpsville, Pa., 58,670.

Alabama City Mill plant, Birmingham Slag Co., Alabama City, Ala., 57,338.

East Toledo Slag plant, The France Stone Co., Toledo, Ohio, 52,070.

Brier Hill plant, The Standard Slag Co., Youngstown, Ohio, 37,586.

Portsmouth plant, The Standard Slag Co., New Boston, Ohio, 34,323.

Wylam open hearth plant, Birmingham Slag Company, Birmingham, Ala., 34,250.

N. D. Connelly Slag plant, N. D. Connelly Interests, Chicago, Ill., 31,639.

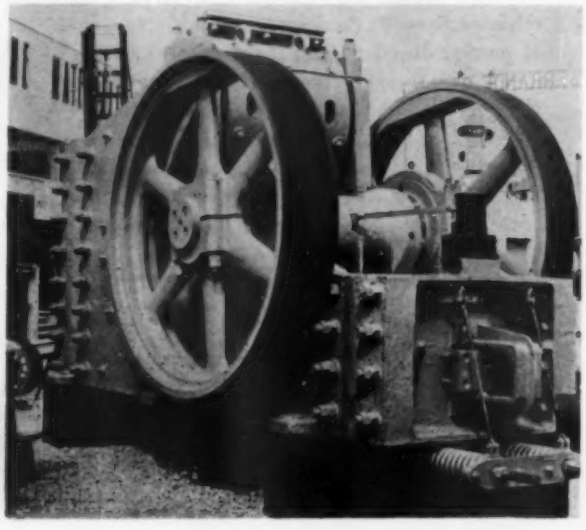
Thomas plant, Birmingham Slag Co., Birmingham, Ala., 30,817.

Monessen plant, Duquesne Slag Products Co., Belle Vernon, Pa., 25,578.

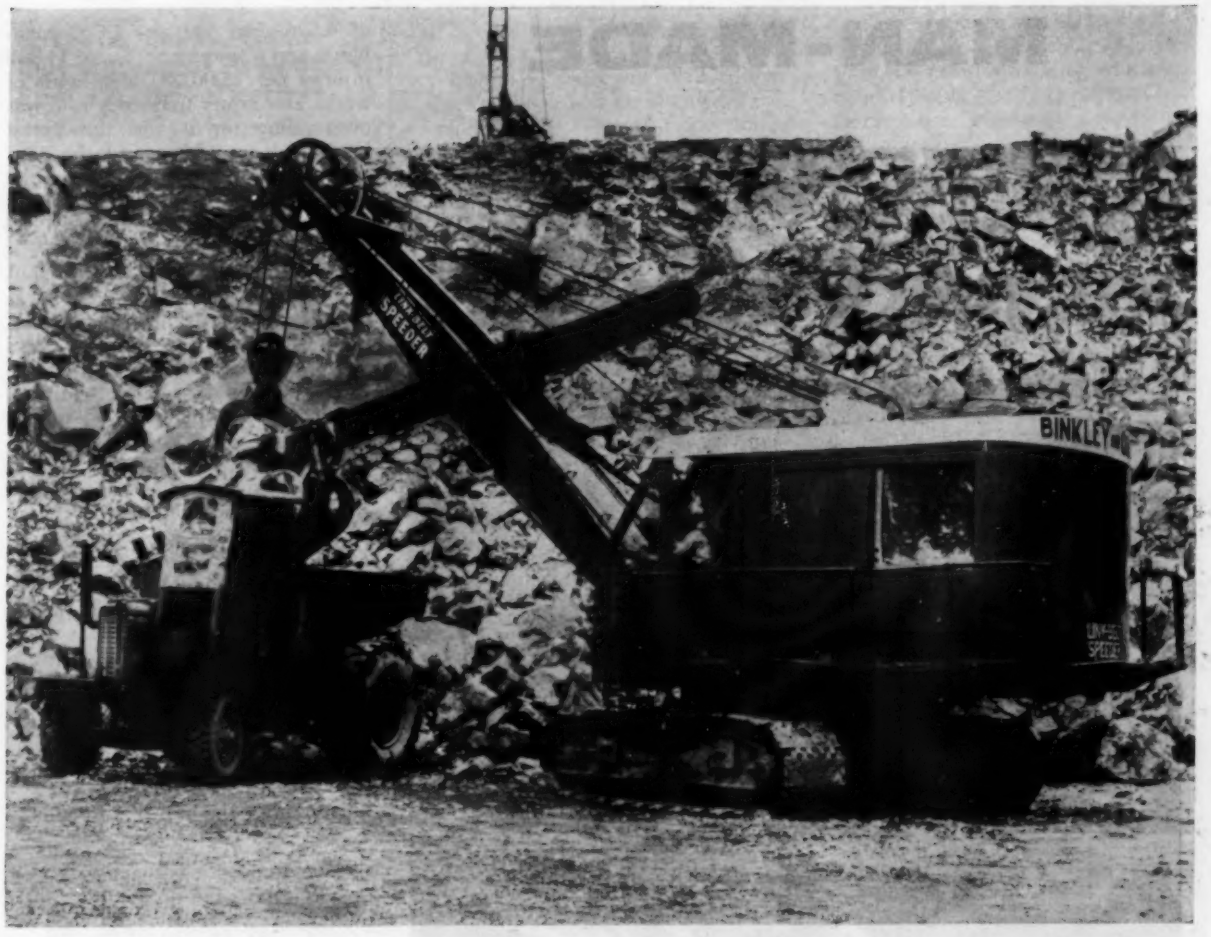
East Chicago plant, Indiana Slag Co., Inc., East Chicago, Ind., 24,460.

Aliquippa plant, Duquesne Slag Products Co., Aliquippa, Pa., 23,940.

Injury Experience — Over-all injury experience at the 45 competing plants was an injury-severity rate



● This 42 by 48-in. "A-1" Allis-Chalmers jaw crusher displayed at the Milan Fair in Italy by Loro & Parisini, demonstrates how a combination of United States and European engineering know-how can be made to pay off in better products for customers. Drawings for this new type of crusher with anti-friction bearings were furnished Loro & Parisini by Allis-Chalmers Mfr. Co. To avoid a prohibitive price, Loro & Parisini engineers substituted a four-piece cast steel frame for the 6-in. steel plate frame specified.



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of 4.526 days lost per 1,000 man-hours and a frequency rate of 14.946 injuries per 1,000,000 man-hours of work. The injury-frequency rate was outstanding for it was the lowest in the five-year history of the contest. The severity rate, although showing a 55 percent improvement over the corresponding rate of 10.137 days in the 1952 contest and an improvement over the five-year competition average rate of 4.698, was more than four times higher than the record low rate of 1.038 days established in the 1950 contest.

There were 46 lost-time injuries at the enrolled plants. Two of the 46 injuries were fatal, 2 resulted in permanent-partial disability, and 42 were temporary in nature. The 46 injuries had a time-loss charge of 13,931 days or a 58 percent decrease under the total time-loss of 33,012 days from 69 injuries in 1952.

The 45 plants competing in the 1953 contest were operated a total of 3,077,684 man-hours and were located in the following 10 states: Ohio and Pennsylvania, 12 each; Alabama, 8; New York, 4; Illinois, 3; West Virginia, 2; and 1 each in Colorado, Indiana, Kentucky, and Texas.

Causes of Accidents — The two fatalities reported were the result of accidents involving machinery. Of the 46 fatal and nonfatal or lost-time injuries, specific causes were reported on 44. Handling material accidents accounted for 27 percent of the total, 18 percent were the results of slips or falls of persons; haulage accidents caused 16 percent; falling material or objects, 11 percent; machinery accidents, 9 percent; flying objects and hand tool accidents, each 7 percent; and burns, 5 percent. Machinery accidents caused the most severe injuries. The total time lost because of this type of accident was 12,154 days or 88 percent of all time lost from injuries of known or reported causes. Injuries from handling material ranked next in severity, followed by those resulting from slips or falls of persons, falling material or objects, haulage accidents, hand tools, burns, and flying objects.

The Competition — This safety competition, sponsored by the National Slag Association and conducted by the Bureau of Mines, is open to any slag-processing plant. The plants enrolled are classed in one of two groups; Group A for those that have operated during the slag year, which is from April 1 of the slag year through March 31 of the year following, 60,000 or more man-hours, and Group B for those plants

(*Continued on page* 42.)

Griffeth, Jenks, Camm Get Universal Promotions; Paul Kirkbride Retires

Three changes in the operating department of Universal Atlas Cement Company have been announced. Thomas J. Griffeth has

J. P. Camm

T. J. Griffeth

been appointed plant manager of the Fairborn, Ohio, plant, and James E. Jenks has been assigned to Mr. Griffeth's former position as assistant plant manager.

J. Palmer Camm has been made plant manager of the concern's Independence, Kans., plant, succeeding Paul Kirkbride, who retired after 35 years with Universal.

Mr. Griffeth was employed at the company's Hannibal, Mo., plant in 1945 as maintenance engineer and supervisor of safety and personnel. In 1950 he was promoted to assistant plant manager at Fairborn.

Mr. Jenks joined Universal Atlas at Fairborn as engineering trainee in 1948. After his training period he was assigned to the post of process engineer, and in 1954 he was named project engineer.

Mr. Camm was first employed as draftsman and surveyor at the Northampton, Pa., plant. In 1926 he was transferred to the Watonga, Okla., gypsum operation as assistant foreman and later as superintendent. He was transferred to the Fairborn plant in 1945.

Mr. Kirkbride became affiliated with Universal in 1919 as engineer and assistant maintenance superintendent at the Northampton, Pa., plant. In 1924 he was transfered to the firm's Hannibal plant as assistant general superintendent. He remained there until 1943, when he was moved to Independence as assistant manager. Two years later he was named plant manager.

Minerals Yearbook for 1951 Available in Bound Volume

The Bureau of Mines *Mineral Yearbook 1951* (P.N. 68221) bound volume is now available. This is the last edition to be published as a single volume; it contains 90 chapters, all of which have been issued as preprints.

Beginning with the 1952 edition, the Yearbook will be issued in three volumes — I, Mineral Commodities other than Fuels; II, Mineral Fuels; and III, Geographic Areas. *Minerals Yearbook 1951* can be obtained only from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., for $5.25 a copy. Be sure to identify it by date, subject and the P.N. number.

$125,000 Material Service Gift To Finance Illinois Tech. Bldg.

A gift of a quarter million dollars from Dr. Edward A. Crown, Irving Crown, Col. Henry Crown, and Material Service Corporation to Illinois Institute of Technology was announced recently by Dr. John T. Rettaliata, president of the Institute.

The money is to be applied to financing the construction of a new $750,000 campus building which will house Illinois Tech's departments of architecture, industrial design, and city planning.

Col. Crown, a member of the Institute's board of trustees, has a special interest in Illinois Tech because of its long service to Chicago's industry and because many of its students are fully or partially financing their own educations.

The proposed building will provide modern and increased space for the development of the three departments which will be housed in it. It will also permit inter-use of their facilities and make possible the moving of the industrial design department, better known as the Institute of Design, from its present quarters at 632 N. Dearborn Street to the Illinois Tech campus on Chicago's near south side.

Crushed Stone Operations Cited By Mines Bureau for Safety Records

THE overall injury experience at crushed stone plants which participated in the National Crushed Stone Association Safety Competition of 1953 was one of the best in the 28-year history of the contest, according to the U.S. Bureau of Mines. The injury-severity rate, 2.336 days of lost-time for each 1,000 man-hours of work or exposure to hazards, was the second-lowest rate on record, a marked improvement over that of 1952, and sharply better than the rate recorded in 1926, the year the contest began. The frequency rate, 17.273 injuries per 1,000,000 man-hours of worktime in the 1953 competition was the lowest rate since 1939, and was the third-best rate recorded during the 28 years of the contest. The safety performance at crushed stone operations in 1953 was another step in the continuing progress made by the industry in keeping accidents and the resulting injuries to the minimum. The current records attest to the co-operation of employee and management in well-founded accident-prevention programs and the usefulness of safety contests as a means to obtain an end. Work can be done safely if the will and desire are sincere.

Winners — Enrolled for the first time in the competition, the Greystone quarry of the Greystone Granite Quarries, Incorporated, at Henderson, N.C., won top honors for having an operating time of 190,859 man-hours without a lost-time or disabling injury. For this outstanding record in safety it was awarded a bronze plaque provided by *Explosives Engineer Magazine*. In addition to the trophy-award, each employee who worked at the plant was awarded a certificate by the association in recognition of his part in making that record at the plant possible.

The Kimballton underground limestone mine of The Standard Lime and Stone Company at Kimballton, Va., ranked in second place in the 1953 contest, with an outstanding achievement of being worked 156,818 man-hours without any disabling injuries. Third place in the competition was the Bakerton underground limestone mine of The Standard Lime and Stone Company at Bakerton, W. Va., which had an injury-free record during a year's work period of 152,088 man-hours. The fourth-ranking operation was the Red Hill quarry of the Superior Stone Company at North Garden, Va. This plant had no lost-time injuries during 135,772 man-hours of worktime.

Injury-Free Operations — Including the trophy winner, there were 2 underground mines and 16 quarries that had no disabling injuries during the contest year. These 18 mines and quarries were worked a total of 1,667,894 man-hours or 21 percent of the total time worked by

(Continued on page 158.)

Measure excavators

by price per pound of lifting capacity

In analyzing shovel operation, you will find that price per pound of lifting capacity on crane rating is also an excellent measurement of excavator value. Remember, lift capacity is *work capacity*. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength, speed and stability to handle bigger loads faster with every excavator attachment.

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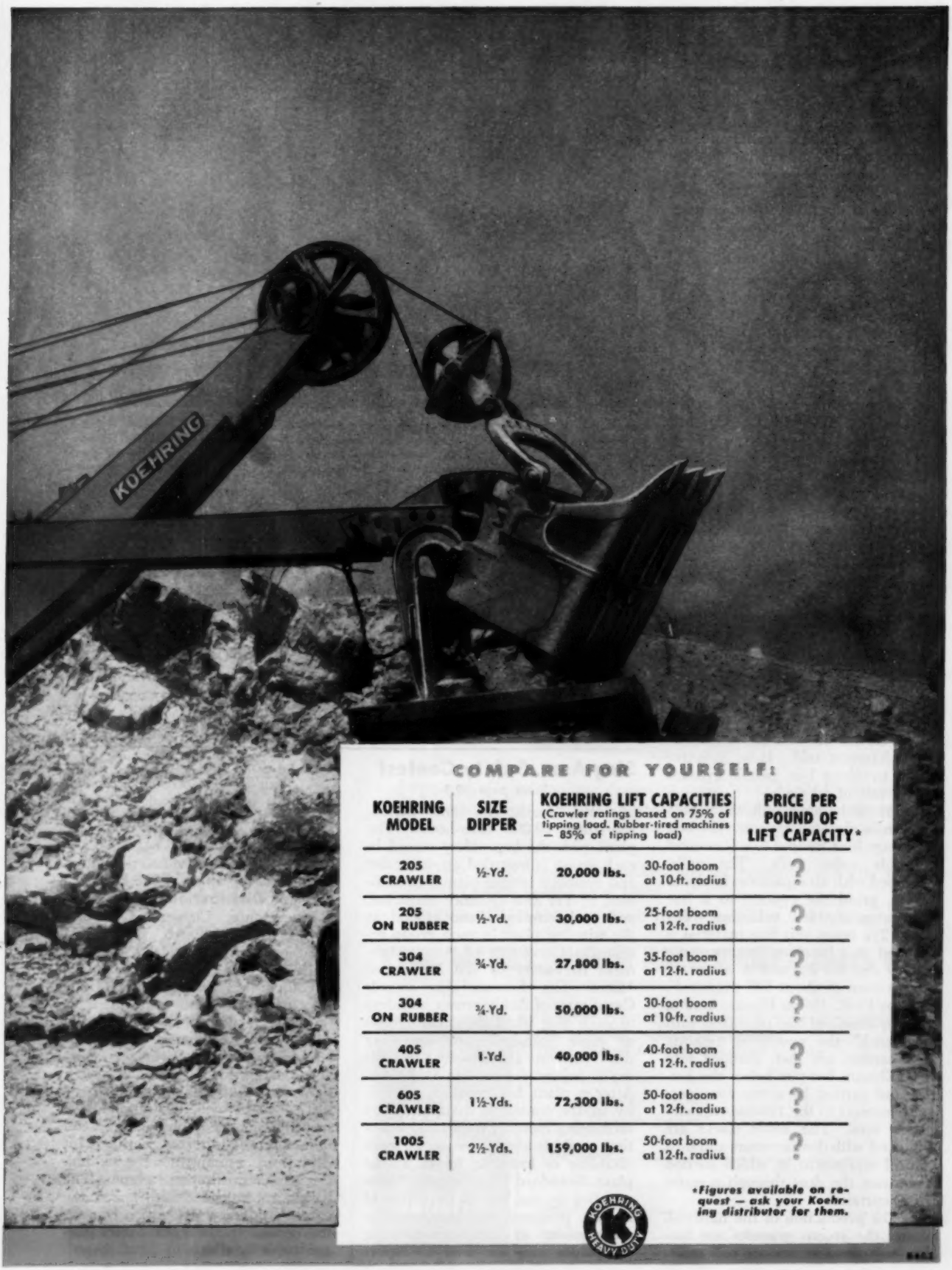

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205 ON RUBBER	½-Yd.	30,000 lbs.	25-foot boom at 12-ft. radius	?
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
405 CRAWLER	1-Yd.	40,000 lbs.	40-foot boom at 12-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-ft. radius	?

Figures available on request — ask your Koehring distributor for them.

KOEHRING HEAVY DUTY

Kaiser Gypsum Opens Wallboard-Plaster Plant—First in Seattle Area

Kaiser Gypsum Company's new integrated gypsum plaster and wallboard plant—the first in the Pacific Northwest—started operating in mid-September, with an official dedication by Henry J. Kaiser, chairman of the board, who told some 700 persons assembled at the plant site in Seattle, Wash., the factual history of the multi-million-dollar project.

The new installation will have an annual capacity of approximately 100,000,000 sq. ft. of ⅜-in. equivalent gypsum board products and 35,000 tons of hardwall and special plasters. The raw materials will be supplied from the company's quarries on San Marcos Island, Mexico, by company-owned bulk ore carriers operated by a subsidiary, Gypsum Carriers, Inc.

At Seattle the ore is taken from the ship's hold by boom conveyor into a shoreside hopper, from which it is transferred by conveyor belt to a covered stockpile building of 25,000-ton storage capacity. This building is a 16-sided dome-shaped structure, 175 ft. in diameter and 75 ft. high; it is of cantilever construction and has steel wall columns covered with metal siding. It is filled from the top center to produce a conical stockpile unobstructed by interior supports. The ore is taken out from the base *via* a draw-down concrete tunnel containing a conveyor belt, which carries the rock to a Pennsylvania hammer mill. Here it is reduced to minus 1-in. pebble gypsum at the rate of 50 t.p.h.

From the hammer mill, the pebble gypsum is elevated by conveyor belt to storage bins feeding two Raymond high-side roller mills. The mills, equipped with air separators in closed circuit, grind the gypsum to a fine powder ready for calcining. For about 2¼ hours this fine material is calcined at a "cooking" temperature of 250 degrees F., and a discharge temperature of about 300 degrees F. Ten- by 13-ft., 18-ton Ehrsam kettles, fired by atomized fuel oil mixed with air, "cook" the powdered gypsum. The batches are then dumped into steel Ehrsam hot-pits below the kettles and carried by screw conveyors and elevators to the 140-ton-capacity stucco bins. The kettle stacks are equipped with dust arrestors and dust control equipment in which suction fans draw the dust through a water spray curtain.

In the production of the hardwall plaster the stucco granules are further re-ground in impact ball mills;

• A general view of the new gypsum plaster and wallboard plant of the Kaiser Gypsum Company at Seattle, Wash., showing clearly the production route of materials from ship to finished products. At right is the dome-shaped, gypsum rock storage structure, offering great economy in cost, maintenance, and usable storage space. The large central building houses the wallboard plant.

retarders and other ingredients are added; and after a 3-minute dry mixing period, the plaster is sacked for shipment.

The board and lath plant is a two-story, steel frame structure, 155 ft. wide by 600 ft. long, with concrete floors and sheet metal walls. Here the stucco granules, sawdust, resin, and other additives, in a dry mix, are moved by a mixing screw conveyor to an Ehrsam pin-type mixer. Water is then added, and the resulting slurry is fed to the forming table, where the subsequent production of wallboard takes place in various steps along the 480-ft. board machine, and the 295-ft. long Coe dryer.

Construction of the Seattle plant was accomplished in eight months by the J. C. Boespflug Construction Company of Seattle, from the design of Kaiser engineers. It is Kaiser Gypsum's third gypsum products plant, others being located at Long Beach and Redwood City, Calif.

Slag Assn. Safety Contest

(From page 38.)

operated, during the same period, less than 60,000 man-hours. The plant with the best safety record in each group is awarded an attractive and symbolic bronze plaque contributed by PIT AND QUARRY magazine, and each employee and official at the winning plant in each group receives a Certificate of Accomplishment in Safety by the Bureau of Mines. The Bureau also awards Certificates of Achievement in Safety to each slag plant that had 20,000 or more man-hours of operating time without a lost-time ("disabling") injury during the slag year. After a plant has enrolled, eligibility in the contest is maintained by submitting monthly reports on worktime and detailed reports on each disabling or lost-time injury at the plant. Standard injury report forms supplied by the Bureau or copies of reports prepared by compensation commissions or insurance-carrying companies may be used to report data on lost-time injuries.

A plant may be enrolled on applications obtained from the Accident Analysis Branch, Health and Safety Division, Bureau of Mines, Washington 25, D. C.

Permanente Opens East Pasco Cement Distribution Plant

Permanente Cement Company opened its East Pasco, Wash., distribution plant on July 29, the unit being the only bulk cement facility of comparable size in the east Washington-Oregon area. The plant is situated at the Tidewater-Shaver docks, at the confluence of the Columbia and Snake Rivers, a favorable location for barge delivery from Permanente's Portland plant.

The plant will be supplied by specially designed, bulk cargo steel barges, towed directly to the plant dock from Permanente's 108,000 bbl. Portland distribution plant. The barges are unloaded with pneumatic cargo handling units, which transfer the cement to the 7,000-barrel storage capacity silos.

New Quarry Operation Started For Bryan Rock and Sand Co.

About 15 acres have been cleared near Rawlings, Va., by the Bryan Rock and Sand Company, Raleigh, N. C., in preparation for the operation of a rock quarry in Brunswick County, Va. The quarry is located between a tributary of the Nottoway River and an unused stretch of railway abandoned in 1943 when the S.A.L. Ry. constructed a more direct line across the river. The firm will use about four miles of spur track and will construct a dam on the creek to create a pond for washing operations.

The operation of the quarry will call for the employment of around 100 persons. Production is expected to amount to about 40 cars of rock a day.

Calaveras Seeks Natural Gas For Plant at San Andreas

Calaveras Cement Company recently announced its intention to seek a source of natural gas in California's San Joaquin Valley for the purpose of fueling its four-kiln plant at San Andreas, Calif.

An initial well was drilled 2½ miles northwest of Lodi in September to a total depth of 4,113 feet; but no shows of oil or gas were encountered. Calaveras has a total of 93 leases comprising 3,800 acres in the vicinity. They are in an area approximately 3½ miles southwest of the Lodi gas field, and 15 miles east of the Rio Vista gas field.

The leases are also close to the terminus of a 43-mile pipeline built by Calaveras in 1941, and currently under lease to Pacific Gas and Electric Company. Calaveras is interested in natural gas because it is a major item of expense in the production of cement. The company spends approximately $1,500,000 annually for fuel.

National Gypsum Dust-Proofs Clarence Center, N.Y., Plant

National Gypsum Co., Buffalo, N. Y., has announced the installation of dust-control equipment costing approximately $333,000 at its Clarence Center, N. Y., plant.

It was explained that new electrostatic precipitator equipment will reclaim waste and control the dust problem, which is now a major difficulty.

Work on the installation has been in progress for several months. F. David Skinner, the company's director of engineering, has been in charge of the work. The plant employs 500 workers and produces wallboard, lath, plaster and sheathing.

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THE *double* main hinge design of these WELLMAN "Williams" buckets gives you many advantages including: lower head room when boom or crane operations are cramped; stronger, more compact construction; and a really "long reach".

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HOW A 22-TON TRACTOR SHOVEL

Hustles All Phases of Production in a Granite Quarry

The purchase of a 3-cu.-yd. Allis-Chalmers Tractor Shovel has brought about a new, more efficient method of operation in a large Texas granite quarry. The versatile HD-15G, equipped with hydraulic front-end shovel and rear-mounted winch now speeds all phases of production.

It scoops up all sizes of granite from fine aggregate to large blocks and loads it into trucks. It winches granite from inaccessible corners and drags 25-ton blocks to rail-mounted cranes for loading onto flat cars. Then, to round out its usefulness, it handles such miscellaneous jobs as building haul roads, laying rock on jetties, excavating for new construction, clearing land, stripping overburden and digging water reservoirs.

Loads Aggregate or Big Blocks Quickly, Safely. Number one assignment for the Allis-Chalmers HD-15G is loading granite into trucks. Granite ranges from "turkey grit" to tombstones. Big blocks are scooped up quickly and safely in the 9-ft. 3-in.-wide bucket. Full hydraulic control enables the operator to ease heavy ones into truck beds with a minimum of shock.

Winches the Big Ones from Anywhere. With a mounted winch, the tractor drags largest granite blocks, weighing about 25 tons, from anywhere in the quarry to a rail-mounted crane. This method eliminates the expense of moving tracks so that cranes can reach granite. Winch also pulls smaller blocks from inaccessible corners to the Tractor Shovel bucket.

Works Anywhere. On special assignment, the HD-15G helps build jetties near Galveston. The job required laying in over 1,500 tons of rock. This tractor dug, carried and placed rock in position. Large blocks, weighing over 5 tons, were handled with a rear-mounted boom.

Handles Tough Excavating. Here is one of many jobs on which the Tractor Shovel demonstrates its powerful excavating ability. In order to assure a constant supply of water for buffers and other machines, the HD-15G deepens and widens a nearby reservoir. In addition, it digs ramps, handles cut and fill work for access roads and strips overburden from granite deposits.

No End to Its Usefulness. The HD-15G continually finds new uses, new jobs in and around the quarry. Every day operators take advantage of its power and versatility for such assignments as clearing land, giving bogged-down trucks a lift, skidding heavy machinery, pulling, pushing, lifting, carrying material of all kinds.

Ask your Allis-Chalmers dealer to show you how the HD-15G can help you meet the demand for greater output. Let him tell you, too, about the three other sizes of Allis-Chalmers Tractor Shovels from the 1-yd. HD-5G to the giant, 4-yd. HD-20G.

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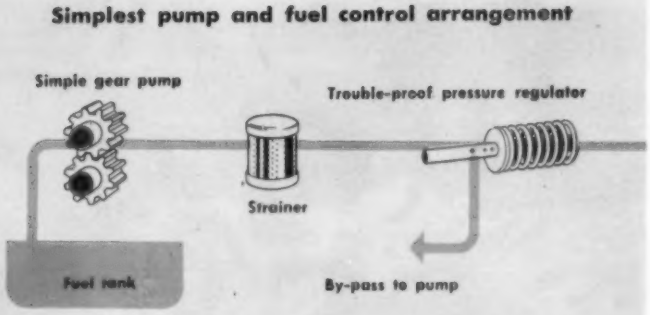
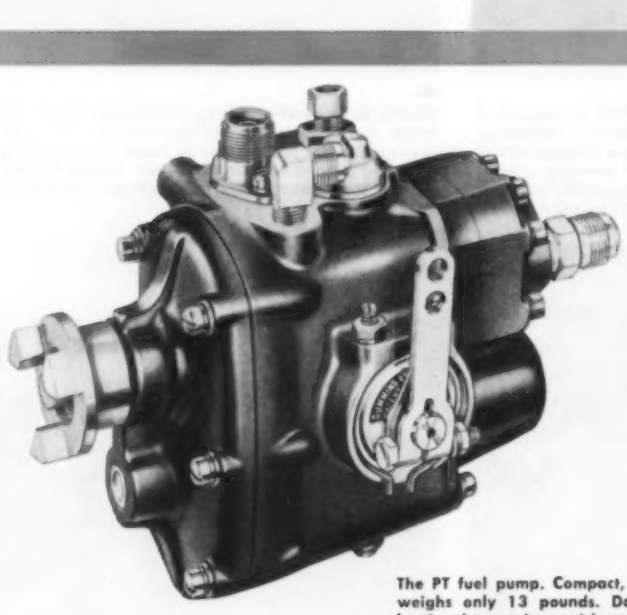
Here's the simplest diesel fuel system ever developed!



Cummins new PT *fuel system...*

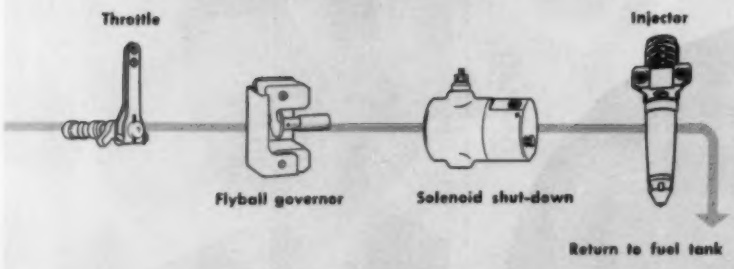


The PT fuel pump. Compact, easy to handle, weighs only 13 pounds. Does not have to be timed to engine, quick and easy to install.

The PT injector utilizes the exclusive Cummins principle of fuel injection which has set the highest standards of performance and economy for more than 20 years.

THE revolutionary new PT fuel system, now standard on all Cummins Diesels, has fewer and far simpler parts than carburetor and ignition systems or ordinary diesel fuel systems. It is easy to understand, simple to work with, can be serviced by any mechanic. No longer any need for fuel system specialists! The PT fuel system has undergone two years of field testing and millions of operating miles under every conceivable condition. Its dependability record is phenomenal. Operators report even less fuel consumption than with earlier Cummins fuel systems and far less cost of maintenance. The PT fuel system can be installed on any Cummins Diesel built since 1932.

Cummins *leader in lightweight high speed diesel power 60-600 h. p.*



PT advantages over gasoline systems:

No contact points to adjust
No condenser to replace
No spark coil to short
No wiring harness to short
No spark plugs
No vapor-lock problems
No flooding
No choking or priming
No needle valves to clog
No butterfly valve
No float level to maintain
No float valve to stick

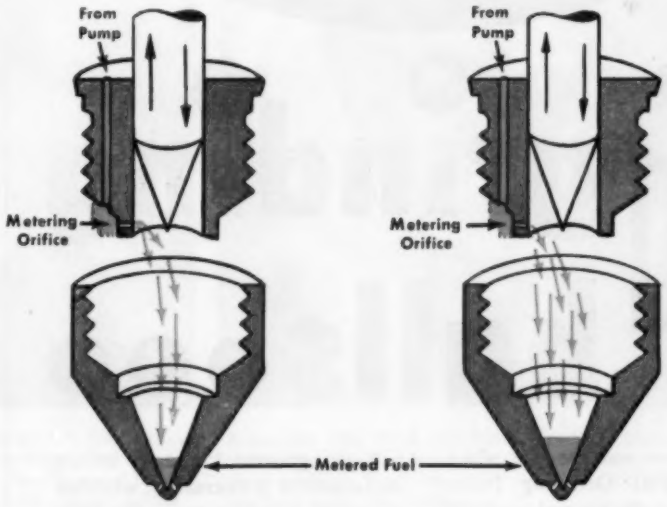
PT advantages over ordinary diesel systems:

No fuel rack adjustments
No check valves
No needle valves
No helixes
No distributor discs
No metering pumps
No high-pressure fuel lines
No fuel pump timing

. . . simpler to work with than gasoline carburetion and ignition

Simplest Fuel Metering Device

The principle is simply that the amount of fuel flowing through a fixed orifice varies according to the amount of pressure on the fuel. Pressure is controlled by the throttle on the PT pump. Fuel flow through orifice is cut off as injector plunger, actuated by engine camshaft, moves down to inject fuel.



When engine is under partial load, fuel pressure is low, and only a small amount of fuel passes through orifice into injector cup.

When engine is under full load, fuel pressure is increased, and greater amount of fuel passes through orifice into injector cup.

Mail this today, and get more PT facts!

CUMMINS ENGINE COMPANY, INC., Dept. PQ-11
Columbus, Indiana

Please send me free illustrated folder, "Cummins PT Fuel System."

Name_____

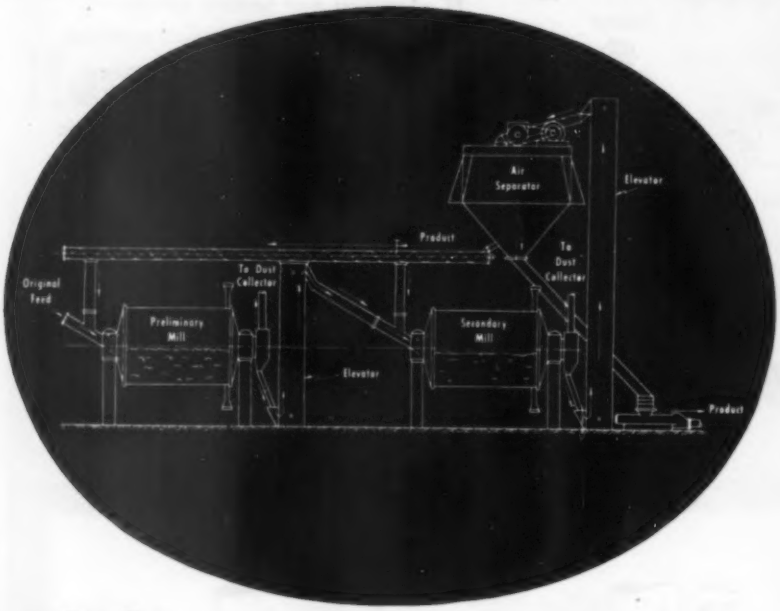
Company_____

Address_____

City_____ Zone____ State_____

CUMMINS

lower grinding costs



with CF&I grinding balls...

Grinding costs can be cut when you use CF&I Grinding Balls. Forged of tough, special analysis steel, CF&I Grinding Balls have the ideal balance between toughness and hardness that means efficient, economical operation. You will get greater tonnages before replacement is necessary, whether in coarse grinding or in the finer mesh sizes. CF&I Grinding Balls are available in diameters from ¾ inch to 5 inches.

other CF&I products for the cement industry

Wickwire Rope • Mine Rails & Accessories • Cal-Wic Industrial Screens

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FORGED STEEL GRINDING BALLS

THE COLORADO FUEL AND IRON CORPORATION

2479

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Bruce R. Wellek

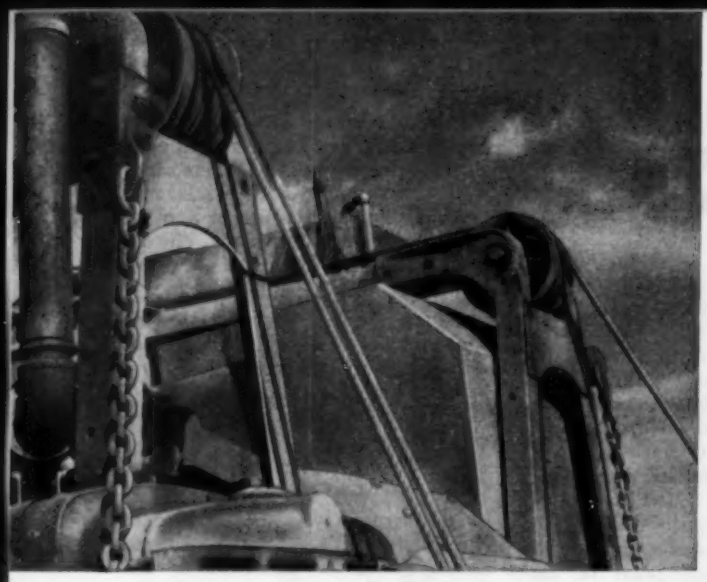
Bruce R. Wellek Appointed To Staff of Pit and Quarry

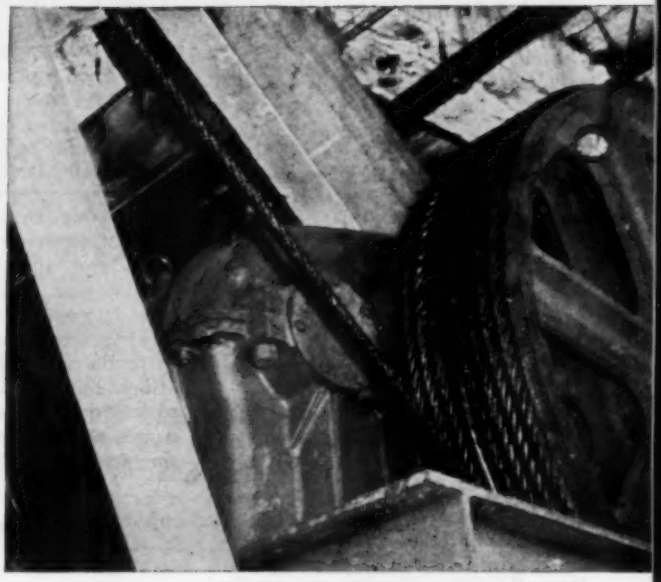
PIT AND QUARRY is pleased to welcome Bruce R. Wellek as the newest member of its editorial staff. Previously he had served for two years on the staff of the house organ at the Hawthorne Works of the Western Electric Company, Inc., and had done other editorial work.

Mr. Wellek received his public school education in the suburbs of Chicago, where he was layout man and reporter for his high school paper. While attending the school of journalism at the University of Illinois, from which he was graduated in 1952, he served as layout supervisor and photographer for *The Daily Illini*. Later he worked as a free lance reporter, covering special events, and as a critic. He also organized and managed a small publication for Newman Hall on the campus which covered the activities of the dormitory and allied organizations.

One of his hobbies is the theatre, and a play which he wrote received favorable comment when presented by the Illini Players. His honors thesis was published by the Illini Press. We feel that Mr. Wellek's talents are in line with our progressive policy of a balanced editorial staff.

The Lincoln Crushed Stone Company, Joliet, Ill., was recently acquired by the Desplaines Valley Construction Company, a subsidiary of Johnston Roadbuilder, Inc., of Joliet. Included in the transaction was a 45-acre quarry.





EXTRA FLEXIBILITY—Wire rope encounters fast sheave action, reverse bending, constant stop-and-start operation on many jobs. When this same rope must also lift or pull heavy loads, an unusually flexible, strong wire rope is needed.

Rope jobs like paver skip hoists, overhead cranes, large shovel and dragline hoists, and sawmill carriages demand these qualities. That's where the use of 6 x 37 Red-Strand wire rope saves time and money.

Where will 6x37 Red-Strand improve your wire rope service?

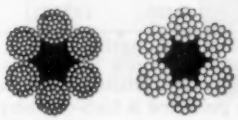
Look at a cross section of 6 x 37 wire rope. You see three rings of small, uniformly sized wires in each strand. This differs from a rope construction like 6 x 19. which contains fewer and larger wires.

The *smaller size* wires make 6 x 37 more *flexible*. The *larger number* of wires maintains rope *strength*.

Would this combination improve your wire rope service? Would it solve a problem for you? Leschen's higher-than-rated quality is also providing longer-than-expected service to heavy industry everywhere.

Check with your Leschen man. He can help you.

Leschen's 64-page Wire Rope Handbook tells you all about 6 x 37 and other Red-Strand wire rope constructions. Ask or send for your free copy.



6 x 37 6 x 19

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

THE November 1, 1924, issue of PIT AND QUARRY might well have been called a Canadian issue as it contained a number of operating articles on outstanding Canadian plants. One of these described the recently enlarged plant of the St. Mary's Portland Cement Company, which, when built in 1912, was said to be the first wet-process cement plant in Canada. Another article described the three plants of Canada's biggest aggregates producer, the Canada Crushed Stone Corporation, which pioneered several important operating methods and devices. The two modern lime plants of the Alabastine Company of Canada at Elora and Teeswater, Ont., were described, as were also the two gypsum plants of the Ontario Gypsum Company, Ltd., at Caledonia and Lythemore, Ont. Other plants described in this issue were the new 200-t.p.h. operation of the J. E. Carroll Sand Company at Franklinville, N. Y., and the river dredge of the Tennessee Arkansas Gravel Company, which operated in the Mississippi River near Arkansas City, Ark., producing 200 cu. yd. of gravel ballast hourly.

In this issue was the first of a series of six articles on *The Economics of Rate Making* by Joseph H. Donnell, an authority on traffic matters. This article dealt exhaustively with all of the many factors governing the setting of freight rates, and it would apply almost as well to present conditions. There was also the fourth in the series of six articles on *Cost Accounting in the Crushed Stone Industry*, by D. J. Hutchinson.

At the annual convention of the Indiana Sand & Gravel Association at Terre Haute on October 14 it was decided to again hire an executive secretary. E. Guy Sutton was elected president, Lee R. Witty, vice-president, and Jesse A. Shearer, treasurer.

News in this issue included the rebuilding by the National Cement Company of part of its plant at Ragland, Ala., which had burned down a few weeks before at a loss of over $750,000.

The November 15 issue might have been called a sand and gravel number as four outstanding plants were described representing different sections of the country. Included were the following: the new operation of the Stony Creek Gravel Company at Stony Creek, Calif., which produced sand, gravel, and rock (crushed gravel); the Ward Sand & Gravel Company, Oxford, Mich., a 200-car-per-day dredging operation; the Silver Springs Sand & Gravel Company, Silver Springs, N. Y., a new 500-ton-per-day scraper-fed plant; and the new plant of the Berkshire Gravel Company of Lenoxdale, Mass. A 10-page article described the expansion of the Union City, Mich., plant of the Peerless Portland Cement Company to four times its former capacity of 500 bbl. daily and the company's new 4,500-bbl. plant in Detroit. Also described was the unusual operation of the Hazelton Stone & Sand Company near Youngstown, Ohio, where sandstone was quarried and crushed and ground into sand, while in another part of the operation it was cut for building stone, millstones, grindstones, etc.

Other articles covered a wide range of subjects, including *Duplicate Units of Machines, Fire Prevention and Insurance Rates, Fuel Conservation in Cement Mill Operation, Depreciation of Plant,* and *Calcined Dolomite in the Recovery of Gold and Silver.*

In the news was the election to the office of U. S. Senator of Fred M. Sackett, vice-president of the Louisville Cement Company, Louisville, Ky. Also announced was the appointment of Arthur Levison as chief engineer of the Road Building Department of the Blaw-Knox Company, Pittsburgh. He had been highway engineer in the Mid-West for the U. S. Bureau of Public Roads.

June, 6-Month Lime Sales Show Consistent Decline

In June, 1954, domestic sales of open-market lime (621,657 short tons) decreased slightly from the previous month, according to reports by producers to the U.S. Bureau of Mines. Building and refractory uses increased over the previous month; decreases were noted for agricultural, chemical, and other uses.

The accompanying table shows sales by types and major uses during May, June (1953, 1954), and the January-June period (1953, 1954).

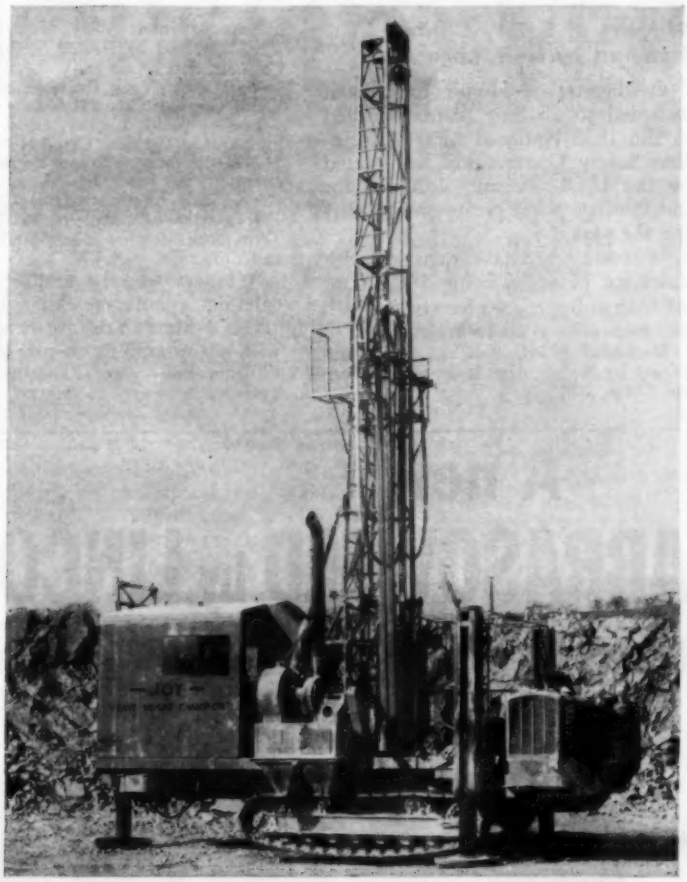
GEORGE E. DICKINSON, 73, a former director and vice-president of the Superior Portland Cement Company, Seattle, Wash., died recently.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1953-54, by Types and Major Uses, in Short Tons

	May	June		January-June	
	1954	1954	1953	1953	1954
By types:					
Quicklime	465,233	460,472	550,949	3,328,629	2,714,761
Hydrated lime	157,651	161,185	160,016	948,174	932,417
Total lime[2]	622,884	621,657	710,965	4,276,803	3,647,178
By uses:					
Agricultural:					
Quicklime	7,367	2,619	1,869	31,527	39,837
Hydrated lime	19,388	14,038	14,217	116,277	118,218
Total	26,755	16,657	16,086	147,804	158,055
Building:					
Quicklime	15,753	18,193	18,284	97,914	93,959
Hydrated lime	79,732	88,434	82,294	454,311	460,449
Total	95,485	106,627	100,578	552,225	554,408
Chemical and other industrial:					
Quicklime	295,753	290,109	336,576	2,027,115	1,713,835
Hydrated lime	58,531	58,713	63,505	377,586	353,750
Total	354,284	348,822	400,081	2,404,701	2,067,585
Refractory (dead-burned dolomite)	146,360	149,551	194,220	1,172,073	867,130

[1]Also includes a small quantity of captive tonnage (6-7 percent of the total reported herein) to maintain comparability with the annual lime statistics. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.
[2]About 60 percent of lime produced is high-calcium; 40 percent high-magnesium.

"...this JOY CHAMPION BLAST HOLE DRILL was so good We Bought TWO More"



"IT OUTDRILLS SEVEN CHURN DRILLS"
at the G. & W. H. Corson Quarry, Plymouth Meeting, Pa.

CHARLES LAUMAN
CONTRACT BLAST HOLE DRILLER
NORRISTOWN, PA.

"That's not all," states Contract Driller Charles Lauman. "Most of our drilling is in hard, tough dolomite with strata tilted at all angles and loaded with clay pockets and clay seams. We have found that the 58-BH Joy Champion will drill a smoother vertical hole wherever the hole is spotted. This eliminates toes and gives our customers a straight vertical face. We're convinced it's the best machine for the job—so much so that we bought two more on the strength of this one's production."

The Joy Champion DRILLS DRY with a tri-cone roller bit which continuously pressure-cuts the rock. An air-blast, forced down the drill pipe and through the bit, cools the bit and forces cuttings to the surface.

The Champion drills straight, smooth-walled, easily loaded holes up to 7⅞" diameter and to any quarrying depth required. It moves fast between holes and sets up quickly for drilling on three hydraulic jacks. Two Champion models—Mediumweight and Heavyweight—can be furnished with either electric or diesel drive. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer
OR WRITE FOR THIS BOOKLET #D-36

W&D R-8374

JOY

PIONEER AND WORLD'S LARGEST MANUFACTURER OF ROTARY BLAST HOLE DRILLS

Winners of Safety Contest Honored by Natl. Lime Assn.

Certificates of Honor have been awarded to 13 lime plants enrolled in the 1953 National Lime Association Safety Competition, conducted by the U. S. Bureau of Mines for outstanding safety performances during the year.

Winners who have quarries with calcining plants working 100,000 or more man-hours are given below with the respective man-hours worked:

Natividad plant, Salinas, Calif., operated by Kaiser Aluminum and Chemical Corp., 283,248.

New Braunfels plant, New Braunfels, Tex., operated by United States Gypsum Co., 251,610.

York plant, York, Pa., operated by National Gypsum Co., 231,626.

Luckey plant, Luckey, Ohio, operated by National Gypsum Co., 187,480.

Millville plant, Harpers Ferry, W. Va., operated by Jones and Laughlin Steel Corp., Blair Limestone Div., 129,241.

Knoxville (Asbury) plant, Knoxville, Tenn., operated by The Standard Lime and Stone Co., 124,400.

Winners who have quarries with calcining plants working less than 100,000 man-hours are given below with corresponding man-hours:

Thomasville plant, Thomasville, Pa., operated by The J. E. Baker Co., 55,219.

Frederick plant, Frederick, Md., operated by Shank and Etzler Lime Co., 19,600.

Winners who have underground mines with calcining plants are given below with the respective man-hours:

Bakerton plant, Bakerton, W. Va., operated by The Standard Lime and Stone Co., 248,776.

Marblehead plant, Quincy, Ill., operated by Marblehead Lime Co., 43,549.

Winning calcining plants and man-hours worked by each one follow:

South Chicago plant, Chicago, Ill., operated by Marblehead Lime Co., 109,-144.

Springfield plant, Springfield, Mo., operated by Ash Grove Lime and Portland Cement Co., 82,061.

Branchton plant, Branchton, Pa., operated by Mercer Lime and Stone Co., 41,264.

It is notable that the total injury-free man-hours of exposure or work-time at these 13 award-winning plants was 1,807,218 or 17 percent of the total hours worked at the 48 competing plants. The achievement of such perfect safety records at these plants indicates clearly that the employees and their supervisors co-operated closely in effective safety programs for the elimination of accidents from day to day during plant operations.

Statistics—Although the injury-frequency and severity rates at the 48 plants were not so favorable as in 1952, each rate was lower than its respective average rate for the 19-year history of the contest. The frequency rate of 16.225 injuries per 1,000,000 man-hours, while 7 percent higher than the previous year's rate, was the second lowest recorded since the beginning of the contest in 1935. The severity rate of 3.219 days per 1,000 man-hours rose sharply, being over half again as high as that of 1952.

The 48 plants enrolled were worked a total of 10,900,000 man-hours. During this period of work-time there were 176 disabling injuries of which 3 resulted in death, 1 was a permanent total, 11 were permanent-partial, and 161 were temporary-total disabilities. The higher severity rate was caused by the increase in fatalities, permanent-total, and permanent-partial disabilities.

Of the four groups of plants into which the competing operations are divided, the injury-frequency and injury-severity rates were highest in the group of quarry and calcining plants that were operated less than 100,000 man-hours, and lowest in the group which included calcining plants only. The average severity of the temporary total disabilities was lowest in the group of underground mines with calcining plants and

A new ABRASOWELD by LINCOLN

Higher alloy content delivers greater resistance to both impact and abrasion... for less cost!

Cuts hardsurfacing costs *on equipment like this dragline bucket. Teeth, lip, bottom and side plates are built up with long wearing Abrasoweld.*

★ **Operates in *all* positions**
★ **Spatter is less**
★ **Beads are smooth...easy to clean**
★ **Can be used with *any* AC or DC welder**

Saves Inventory. Why stock so many different hardsurfacing rods? Two Lincoln rods . . . new Abrasoweld and Faceweld handle almost all your hardsurfacing needs. And Lincoln delivers *more wear per dollar* to cut your hardsurfacing costs.

Specifications and procedures on new Abrasoweld and Faceweld are in Lincoln Weldirectory on Hardsurfacing. Write for Bulletin 466.

THE LINCOLN ELECTRIC COMPANY
Dept. 5206 • Cleveland 17, Ohio
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

highest in the group that consisted of calcining plants only.

Cause of Accidents—For the second consecutive year accidents involving burns accounted for the largest number of injuries. They were the cause of 17.1 percent of all injuries of reported origin. Other principal causes of injuries were attributed to falls of persons (14.6 percent), handling materials other than rock (14 percent), haulage accidents (13.4 percent), falling objects (7.9 percent), and machinery accidents (7.3 percent). The most severe injuries were from accidents in which machinery was involved. This agency caused the death of 2 employes, and 3 permanent-partial and 7 temporary-total disabilities for a total time-loss charge of 12,539 days or 37 percent of the total time lost from all injuries. Ranking second in severity were injuries from haulage accidents—10,218 days or 30 percent —and third, with 6,620 days of time loss or 20 percent, were injuries caused while material other than rock was handled. These three causes were responsible for 87 percent of the total days of disability or 29,377 days.

Scope of the Competition—The 48 plants in the 1953 competition were located in 16 states, as follows: Pennsylvania, 8; Ohio, 6; Maryland and Missouri, 4 each; California, Illinois, Texas, West Virginia, and Virginia, 3 each; Massachusetts, Nevada, New York, and Wisconsin, 2 each; and 1 each in Michigan, Minnesota, and Tennessee.

The Competition—Sponsored by the National Lime Association, this safety competition is conducted annually by the Bureau of Mines. Any plant that produces quick or hydrated lime or dead-burned dolomite of which all or a portion of the resultant product is sold commercially is eligible. Applications for enrollment may be obtained from the Accident Analysis Branch, Health and Safety Division, Washington 25, D. C.

Universal's First "Grad" Wins Apprentice Diploma

At the Duluth, Minn., plant of the Universal Atlas Cement Company a diploma was awarded recently to Lawrence Jacobson, first of the firm's employees to complete its apprenticeship training program.

Mr. Jacobson, who enrolled in the course in 1951, is now a full-fledged electrician. The course, conducted with the International Correspondence School, involves on-the-job training and trade theory. One-half of the expense is borne by Universal Atlas.

HORSEPOWER

. . . a size and type for every need

Whether it's repowering old equipment or buying new — too much or too little horsepower can prove costly. Equally as important as proper horsepower, is correct engineering of the application. Quite often, it is necessary that engine accessories be mounted in accordance with requirements of the equipment. It usually takes a right size and right design to supply the specific power needs for each type of machinery.

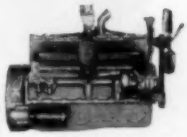
The engineering and sales policy of Hercules Motors Corporation is to design and sell internal combustion engines to fulfill the specific needs of each customer. For example, in equipment with limited engine installation area, "flat" or horizontal engines are often the answer. These engines can be placed under floors, or in any area which does not permit vertical installation. (Consult factory for models available.) Special Hercules vertical engines with accessories located on one side, permit installations near a firewall or bulkhead which is permanent and does not allow access to one side of the engine. These are but a few of the many problems which are often encountered in the proper application of an engine.

Our basic line of Hercules engines, 70 models from 3 to 500 H.P., is designed and engineered to meet the exact and varying demands of industry. We build engines for operation on gasoline, diesel fuel, natural gas, L. P. Gas, kerosene, or any other standard fuel that is readily available. That's why we have been known as "Engine Manufacturing Specialists Since 1915"

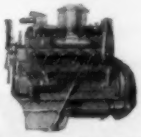
If you'd like to know more about our engines, write for the folder "Hercules Engines". It lists the sizes and power ratings of each model. If, however, you have a specific power problem give us the details. Our engineers will work with you to solve your problems and of course, there is no obligation.

Hercules Model NXB
2 cylinder gasoline engine
15.6 H.P.

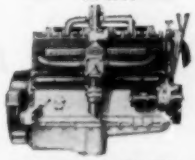
Hercules Model DOOD
4 cylinder diesel engine
79 H.P.



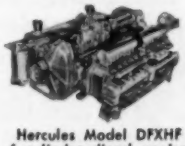
Hercules Model JXD
6 cylinder gasoline engine
112 H.P.



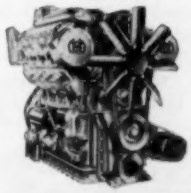
Hercules Model DIX6D
6 cylinder diesel engine
93 H.P.



Hercules Model HXE
6 cylinder gasoline engine
236 H.P.



Hercules Model DFXHF
6 cylinder diesel engine
260 H.P.



Hercules Model DNX-V8DTS
8 cylinder diesel engine
500 H.P.

Engine Specialists since 1915

HERCULES ENGINES

HERCULES MOTORS CORPORATION

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We tie truck axles in

in the new Timken-Detroit indoor proving ground

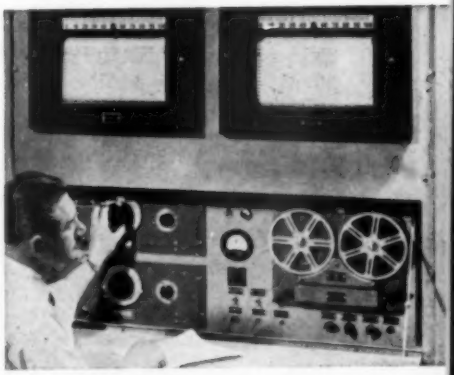
. . . and only Timken has it!

We smash, twist, jerk and over-load them. Match every imaginable hauling situation. Then add a few ruinous tricks of our own.

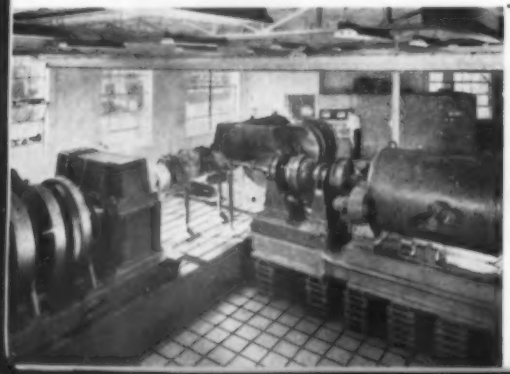
It's done on purpose. So we can tell you in advance that a Timken-Detroit axle can take a more brutal beating on the job it was designed for than any other axle made.

To prove it, we condensed a multi-thousand acre proving ground into one room. In it, our engineers can apply 50 years of experience in building axles for trucks, buses and trailers. Here axles and gearing are subjected *indoors* to any possible *outdoor* hauling condition. Axle performance is measured and analyzed under absolute scientific control!

As a result: you enjoy longer axle life; less maintenance, repairs and down-time; lower operating costs; fatter profits. No wonder Timken-Detroit axles are the choice of manufacturers and owners everywhere!

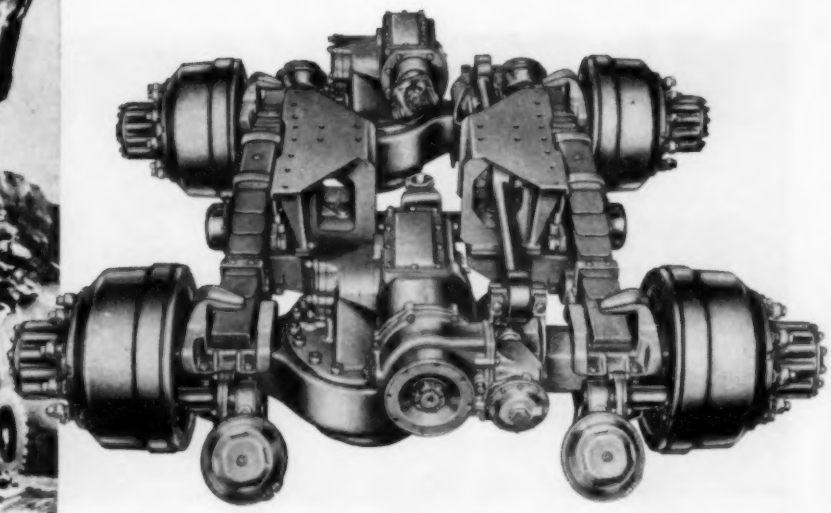


This is our "truck driver." He works in our "Torture Chamber." Above him are graphs showing speed and torque performance under any operating condition he chooses . . . soft ground at full load . . . mountains . . . express highways or side roads. With special dials, recorders and electronic devices, he actually *drives* the axle with scientific accuracy from his chair!



How TDA proves axle quality in this "Torture Chamber"

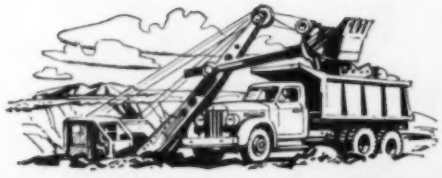
We pick one of our axles at random . . . then duplicate a hauling condition, hour after hour, day after day . . . simulating half a million miles of the toughest driving situations in just a few days. Or "invent" a test like going uphill with a full load from California to New York non-stop. There is no other axle testing like it in the world!



THREE TYPES: Hypoid-helical double-reduction, optional inter-axle differential. Worm drive, without inter-axle differential.

Soft ground? Heavy load—all up-grade? That's a tremendous strain on an axle. But it's nothing compared to what we do in the indoor proving ground! For instance—we take an axle shaft and twist it 14° forward and backward, 36 times a minute, 24 hours a day, week after week. And that's only one test to give you low-cost performance, long axle life regardless of your hauling conditions.

knots



TIMKEN Detroit AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted TDA Standard
TRADE MARK REGISTERED

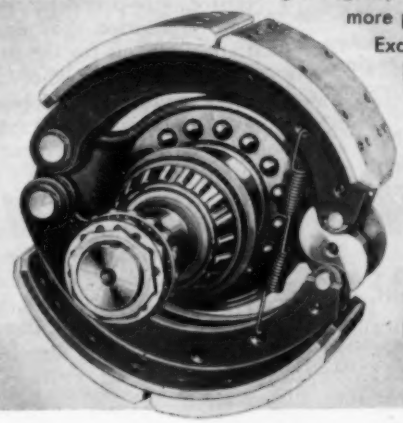
"TORTURE-TESTED" to Save Money on the Job

WORLD'S LARGEST MANUFACTURERS OF AXLES FOR TRUCKS, BUSES AND TRAILERS

For six-wheelers . . . the TDA Tandem Drive Rear Axle Unit

Now—the *world's finest* tandem drive rear axle unit for heavy-duty motor trucks! And with these features, developed, introduced and pioneered by TDA: (1) Available in 3 types of final drives and 3 capacities. (2) Top-mounted straight-line final drive eliminates propeller shaft angularity. (3) Optional inter-axle differential . . . spur gear design, cab-controlled power-lockout. (4) Torsion flow axle shafts . . . guaranteed for 100,000 miles or three years, whichever occurs first. (5) Hot forged steel axle housing . . . guaranteed for the life of the vehicle. (6) Unit-mounted "P" series power brakes . . . for longer life, greater economy and efficiency. (7) Cradle ride spring suspension and paralleled torque rod system . . . maintain correct alignment and weight distribution regardless of driving and braking conditions. (8) Exclusive two-piece trunnion tube bracket speeds servicing. (9) Removable torque rod and spring guide brackets . . . for positive alignment, easier replacement. (10) Rubber torque rod bushings and rubber spring seat bushings...eliminate metal-to-metal contact. Require no lubrication.

New TDA brake shoes save up to 40 lbs. per axle



• Lightweight, pressed steel construction to give you more payload plus long wear and safety. Exclusive ¾" TDA "Econoliner" brake liners held rigidly by 12 deep-set rivets per block—*not bolts*. Liners are thickest at center where greatest wear occurs—taper down at ends. Result—longer wear, greater stopping ability. New cam roller mountings never seize or brinnel. Light nylon camshaft bearings wear up to 4 times as long! It's America's new brake shoe!

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

● Overall view of newly dieselized portable rock crushing equipment owned by the Killough Construction Company, Inc., Ottawa, Kans. Powered by five diesel units, the equipment is easily moved to any one of six quarries leased by the company.

Diesels Cut Operating Costs For Portable Crushing Plant

Diesel engines recently installed on a portable rock crushing plant have cut costs and reduced engine down time in the quarrying operations of the Killough Construction Company, Ottawa, Kans. This company owns a portable plant and circulates it between six leased quarry sites.

Dieselization of the company's equipment was completed in July with the repowering of a ¾-cu. yd. Northwest shovel. The new engine, a General Motors Series 71 diesel, replaced a gasoline engine. It increased the shovel's work capacity considerably, and its operating costs were cut by about one-third. Using the same type of power on each piece of equipment in the operation has facilitated servicing and standardization.

Other equipment in use includes a Cedarapids hammermill driven by a G.M. Twin 6-71 mounted on a small truck, and a Cedarapids 22-by 36-in. primary jaw crusher driven by a G.M. 6-71. A second shovel used in the operation—a Unit ¾-cu. yd. machine—is also driven by a G.M. diesel. A fifth diesel engine drives the screens and conveyors. The plant, currently operating near Ottawa, is turning out 125 t.p.h.

Robert Killough is president of the company; he is also secretary and treasurer of the Kansas Limestone Producers Association.

$1,000,000 Sand Operation Slated for Brentwood, Calif.

The application of the Brentwood Silica Sand Company for the establishment of a quarry and a sand plant on a 340-acre tract near the exclusive Brentwood, Calif., residential area has been approved by the Contra Costa County Planning Commission.

According to a company spokesman, the firm will make an initial investment of $1,000,000 for the operation, which will be installed to mine and process sand for the glass industry.

There were no objections from the residents; and the permit was granted on the condition that the company will agree to confine its blasting operations to the hours of 7 a.m. to 6 p.m. and also take adequate dust-control measures.

Canada Cement Co. Builds 1,000,000-Bbl. Plant in Alta.

Preliminary work has started on the 1,000,000-bbl. cement grinding and shipping plant of Canada Cement Company Limited in Edmonton, Alta. The plant is scheduled for completion in 1955.

The site of this plant is conveniently located to serve the company's customers in the Edmonton district. J. Narsted, vice-president and manager of production, has completed final arrangements for the project.

While the initial plant will be a clinker-grinding and shipping unit, it has been designed to serve eventually as a portland cement manufacturing plant.

Under the terms of a three-year contract signed at Ste. Genevieve, Mo., by the Mississippi Lime Company and the Quarry Workers Local 829, AFL, a series of three wage increases and fringe benefits were guaranteed to the firm's 250 employees.

MARION

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MARION POWER SHOVEL CO. • MARION, OHIO

FOR BIG PRODUCTION in sand and gravel

MARION 111-M

This Indiana plant needs big production to keep pace with its demand for cement, hot mix, sand and gravel.

The MARION 111-M, can handle a 4 cu. yd. bucket on 100′ boom. Easily and dependably, it keeps the raw materials flowing into the busy plant. It handles the stripping assignments, too. The long boom and easy maneuverability of the MARION hold movements of the carloading hopper to a minimum. Why not learn today what the MARION 111-M can do for you in sand and gravel or stone loading?

MARION POWER SHOVEL CO.

MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES

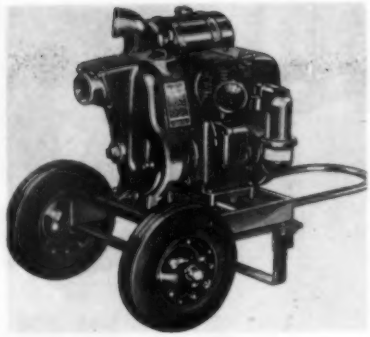
from 1 to 60 cu. yds.

IN ALL PRINCIPAL CITIES

O-G **OSGOOD • GENERAL,** a subsidiary, manufactures excavating machines from ½ to 2½ cu. yds., truck cranes from 15 to 25 tons, Mobilcranes from 25 to 45 tons, and log loaders.

New Machinery and Equipment

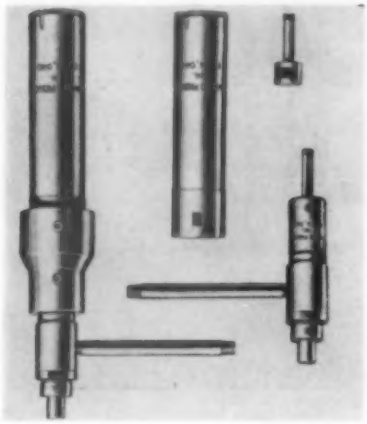
(For more information, use card on p. 131)



● With a 10 ft. lift the Gorman-Rupp 32G-AKN contractor's pump has a total head friction of 25 ft. and will pump 166 g.p.m. It is fast priming to 30 ft. static lift and measures 30" x 25" x 35" with a total weight of 160 lb. The pump is powered by a Wisconsin AKN 6.1 hp. engine. **(52)**

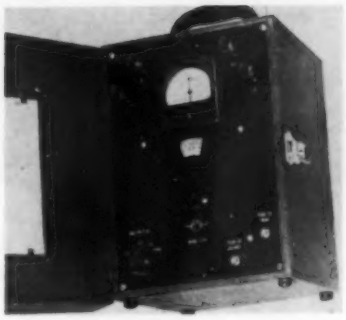
● Dart's new 45 ton crane carrier is powered by a 240 hp. Waukesha gasoline engine and utilizes a Fuller 10-speed transmission and 100,000 lb. rear tandem axle. Tires are 14:00 x 24, single front and dual rear. It features Dart's box girder frame and boxed beams extendable to 15½ ft. **(51)**

● A new line of vinoy diamond impregnated drills has been announced by Diamond Products, Inc. The diamonds are distributed throughout a matrix of tungsten carbide or molybdenum. **(53)**



● This 2-compartment, 24½-ft. tube mill which is 10-ft. in diameter, with central peripheral discharge, has been designed and built by Electro-Mechanical Construction Co. in Johannesburg. **(54)**

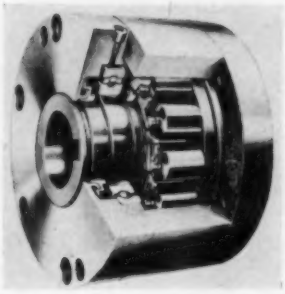
● Earth resistivity is measured by electrical resistivity methods by this Vibroground model 274. The instrument uses the four electrode A.C. fall of potential method and reads resistance directly on a large, dial-type potentiometer calibrated to an accuracy of 1 per cent of full scale. **(55)**



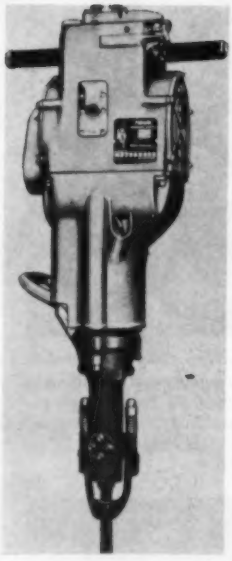
● Excellent visibility and versatility are two of the features of the Baker-Lull Shoveloader line of bulk handlers. It lifts 1500 lb. of bulk material to 7 ft. and has a 90 in. turning radius. **(57)**

● Look and see how these 3 applications of TSP parts stand up under rugged use (1) At a cement plant, installed Aug., 1947—no appreciable wear yet. (2) At an asbestos cement siding, installed May, 1950, hardly worn. (3) At a cement products plant, put in Sept., 1950, negligible wear. **(56)**

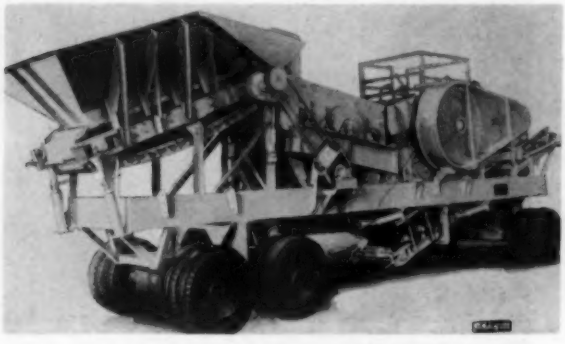
● Osgood-General's new model 250 crawler-mounted ¾ cu. yd. machine features a shovel boom which is all steel, welded box type constructed and 17 ft. long. The standard boom length is 35 ft. and inserts are available. **(58)**



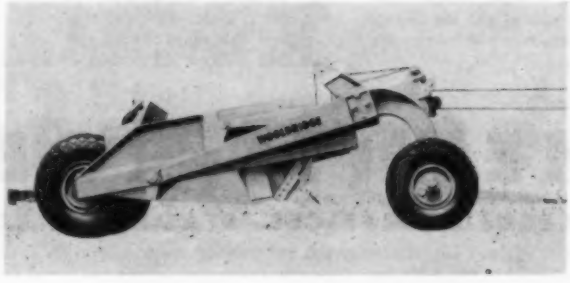
● The new series K clutches by Morse are made in 4 standard sizes and all have made-to-order bore and keyway sizes. These reavy-duty ball bearing overrunning clutches have tapped holes in both ends for attaching sprockets, gears, etc., and stand up to 6000 foot-pounds. **(59)**



● Weighing only 86 lb. fully equipped, the new Pionjar portable, self-contained gasoline-engine driven drill and breaker is a very hardy tool for the quarrier. It drills 16 in. per min. at depths up to 13 ft. in granite. It can be furnished with tungsten-carbide bits. **(60)**



● This new portable primary plant made by Pioneer by-passes material already down to size by using a screen ahead of the primary crusher and effects great savings and increased productivity thereby. **(61)**



● Here is one of four new Woolridge open bowl scrapers which has a heaped capacity of 10.5 cu. yds. The other new models have capacities of 15.0, 18.0, and 25.0 cu. yds. **(62)**

FORWARD!

by

LUBRIPLATE LUBRICANTS

The introduction of LUBRIPLATE Lubricants established a new high standard for industrial lubrication. Now, a recently patented improvement in the production of LUBRIPLATE results in even greater lubrication efficiency. Under today's operating costs, reduction of down time, less parts wear and replacements, as well as lower power consumption, far outweigh any differential in the initial cost of LUBRIPLATE Lubricants.

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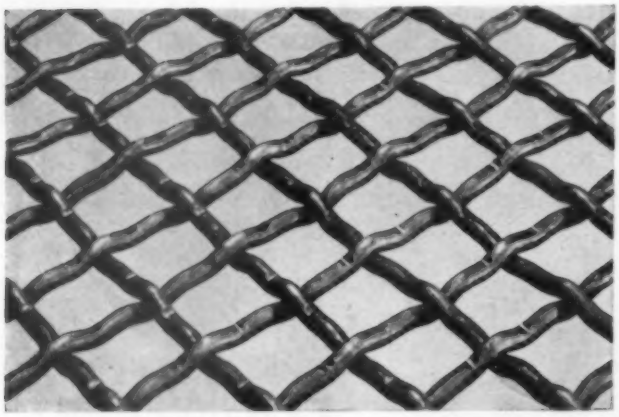
Hewitt-Robins Equipment

Our Complete Line of Equipment Will Solve Your Bulk Materials Handling Problems, Large or Small

Hewitt-Robins is the only company that designs and manufactures a complete line of equipment for handling and processing solids, liquids and gases in bulk.

We specialize in vibrating equipment to screen, feed or shakeout material—belt conveyor systems (both belting *and* machinery) to convey solids in bulk—hose to handle liquids or gases.

Throughout the world, Hewitt-Robins equipment and complete systems are setting new records for safe,



Screen Cloth. Hewitt-Robins screen cloth is specially engineered to accurately size large tonnages and cut screening costs . . . utilizing a full range of metallic wire to meet individual job requirements . . . available in standard production size openings from 3/16" and coarser; wire sizes from .105" up to and including 1" diameter.

Belt Conveyors. Hewitt-Robins designs and manufactures a complete line of belt conveyor systems engineered to meet the specific requirements of particular jobs . . . Belting, conveyor machinery and component parts are readily available from standard "on-the-shelf" stock, and are guaranteed to provide top conveyor performance.

Vibrating Screens. Hewitt-Robins manufactures four types of economical vibrating screens . . . Gyrex® positive stroke 4-bearing screens; Eliptex® horizontal operating flat screens; Vibrex® full-floating, unbalanced pulley-type 2-bearing screens and the Eliptex Dewaterizer having specially designed Eliptex screen with micron-size opening stainless steel flat rod deck.

Vibrating Feeders and Conveyors. Fully mechanical, high capacity—low power consumption vibrating feeders easily maintained by your own personnel. Continuously balanced vibrating conveyors now available in longer units with higher capacities at lower horsepower. Handle a wide range of materials—wet or dry, lump or pulverized, packaged or loose, hot or cold, abrasive or corrosive.

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Means Production Economy

dependable, economical operation . . . speeding up production and cutting costs-per-ton.

Find out how Hewitt-Robins can answer your bulk materials handling and processing problem with the right equipment to meet your particular needs . . . contact our staff of experts today.

Hose. Hewitt-Robins manufactures over 1,000 types of industrial hose . . . each designed to fill a specific hose application. Hewitt-Robins hose has proved its superiority on the job. In case after case, actual performance records prove that Hewitt-Robins hose is safer, performs longer, provides greater economy.

Shakeouts. Hewitt-Robins Car Shakeouts handle wet, compacted and even partially frozen loads. Capacities vary depending upon characteristics of material . . . average unloading time under 5 minutes per car. Two types: 5-ton HD (Heavy Duty) for handling up to 100 cars per day —3½-ton GS (General Service) recommended for up to 10 cars per day. Both models available with companion twin-hook Car Shakeout Hoist.

Here is a partial list of

HEWITT-ROBINS PRODUCTS

that will help you cut handling costs and increase operating efficiency.

MACHINERY

- Belt Conveyors
- Belt & Bucket Elevators
- Car Shakeouts
- Conveyor Idlers
- Dewaterizers
- Mechanical Feeders
- Foundry Shakeouts
- Mine Conveyors
- Reclaiming Systems
- Screen Cloth
- Stackers & Trippers
- Vibrating Conveyors & Screens

INDUSTRIAL RUBBER PRODUCTS

BELTING:

- Conveyor
- Elevator
- Transmission

HOSE:

- Acid
- Air & Air Drill
- Barge Loading
- Dust Suction
- Fire
- Fuel Oil & Gasoline
- Gasoline Pump
- Mud Pump Suction
- Oil Suction & Discharge
- Propane-Butane
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- Rotary Drilling
- Sand Blast
- Sand Suction
- Sea Loading
- Servall®, All-Service
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MOLDED RUBBER PRODUCTS

•

For information and service on industrial rubber products, contact your Hewitt-Robins Industrial Supply Distributor. Through his complete stock of Hewitt-Robins Rubber Products, and his familiarity with local field conditions, he can fill your supply needs promptly and correctly. See Classified Phone Book for the Hewitt-Robins Industrial Supply Distributor serving your area.

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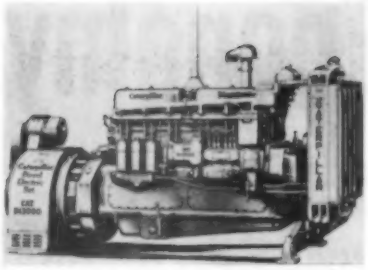
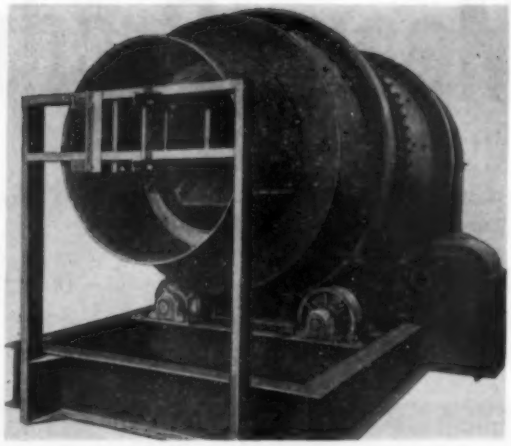


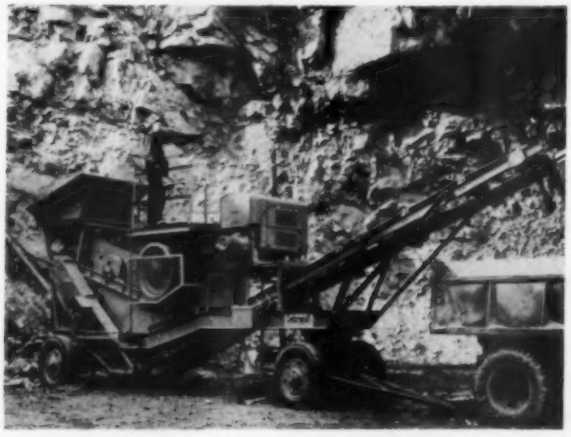
● Changes in the design of the Caterpillar D13000 diesel engine have increased its output from 1000 to 1225 rpm and increased its capacity from 80 to 100 KW. Larger water lines and water manifold supplement a new pump to provide improved cooling. The new, oil-cooled pistons are made of high-strength, low-weight aluminum alloy. **(63)**

● Designed primarily for the removal of loam, light clays and soft materials from aggregates, the McLanahan Hi-Speed scrubber works on a centrifugal force basis. The cylinder is revolved by removable steel tires and power is transmitted by a roller chain from a 100 hp., 155 rpm gear motor. **(64)**

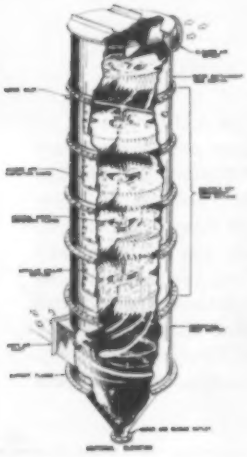


● A light ¾-yd. shovel crane is being announced by Link-Belt. Called the Speeder, the machine supersedes the famous LS-52 and offers all of its predecessor's refinements plus a heavier frame, larger, more rugged track-rollers, and the use of 24 in. or 30 in. shoes. **(66)**

● Cedarapid's new portable single-pass crushing plant produces excellent results when two sizes of low-cost gravel or rock are required on jobs where material does not have to be accurately graded. The simple design of the plant, with few moving parts, easy accessibility and inexpensive replacement parts result in low operating and maintenance costs. **(65)**

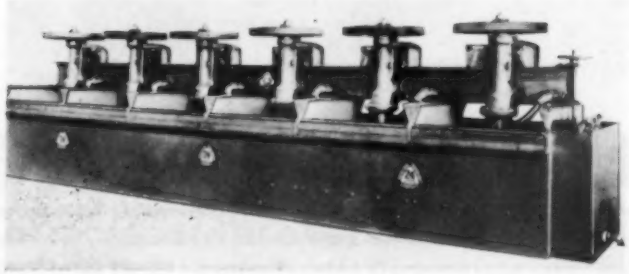


● Davey's new water truck is capable of carrying extra large bulk loads and is constructed of heavy-gauge steel with floor section covered with safety-plate. **(67)**



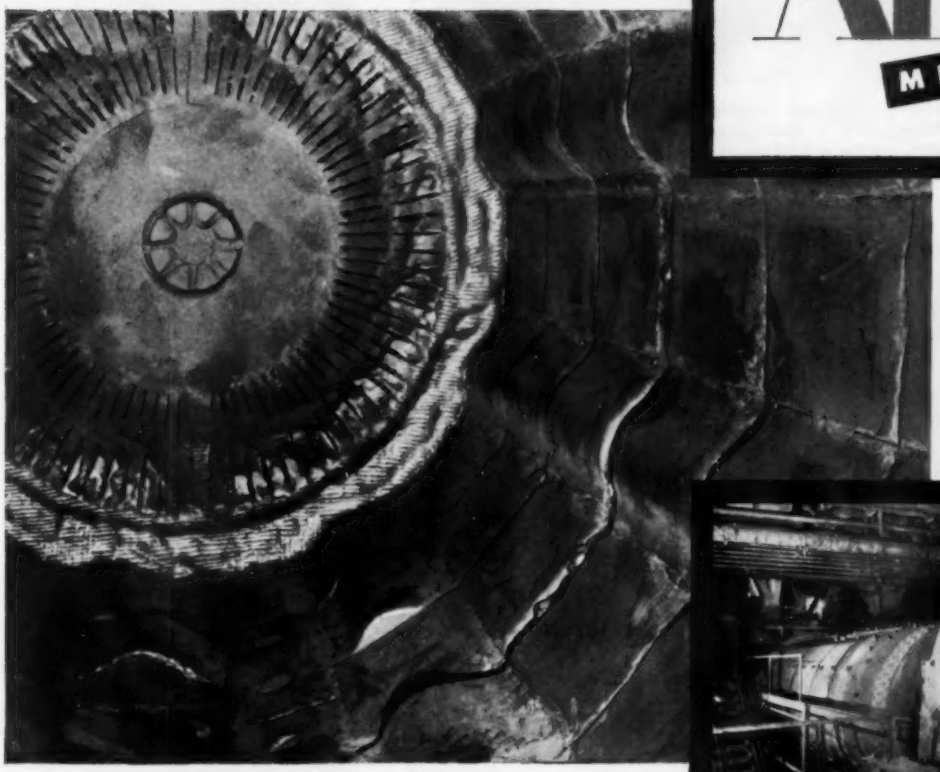
● Ingenious design is apparent upon inspection of this diagram of the Pangborn CW-I centrifugal wet dust collector which solves the dust problem for those who cannot use the cloth type. It is of counter-current design (air flow counter current to water flow), and of tower-type construction. **(68)**

● This No. 24 Denver Super-Rougher flotation machine features the new suspended unit shaft assembly designed for simple, efficient operation in handling high tonnage and bulk flotation. **(69)**

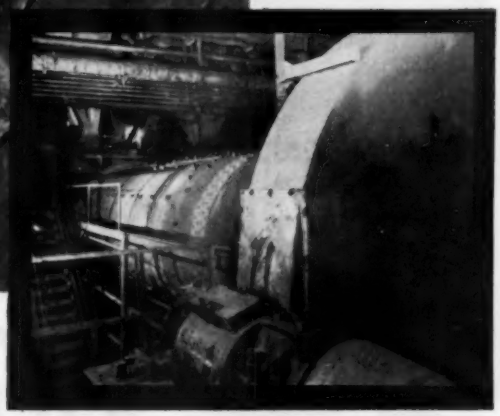


STANDARD PORTLAND CEMENT

increases liner life with ABK® METAL



Interior of Standard Portland Cement ball mill. Note good condition of liners after 6 years service.



Standard Portland Cement Division, Diamond Alkali Company, Painesville, Ohio, has found that ABK Metal ball mill liners give markedly increased service life. Installed six years ago, these ABK Metal liners have at least 18 months of service left. They replaced liners installed in 1943 that were removed after only five years of relatively light use in low production schedules.

Wherever extreme abrasion is a major problem ABK Metal parts have consistently proved superior to ordinary "abrasion-resistant" materials. The experience of Standard Portland Cement is typical among firms that require long, uninterrupted operation of equipment handling abrasive materials. Specify these exclusive Brake Shoe nickel-chrome castings with controlled matrix structure and hardness when you want the extra service that means high efficiency production and low maintenance costs. Write today, for complete information.

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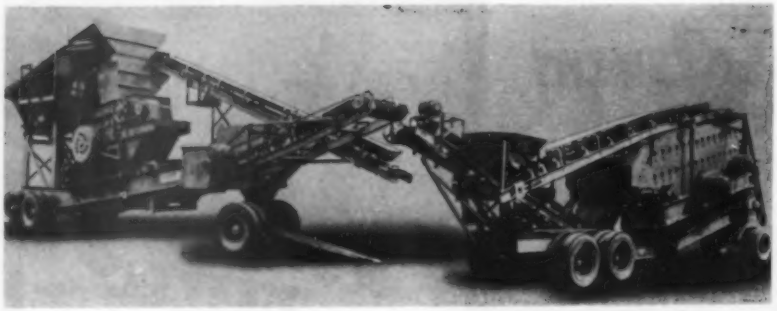
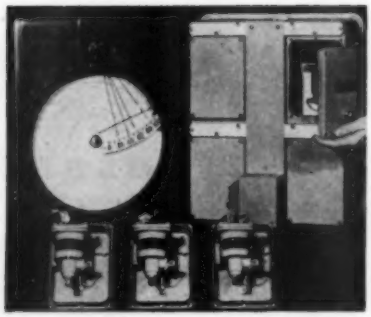


● Universal's two-unit hammermill crushing, screening and loading plant designed for operation in wet, sticky materials and in quarries with clay balls and mud pockets will produce aglime and road rock, aglime and chips, or 100% aglime. It has an all-electric drive with convenient control panel located on the operator's platform. (70)



● The new Bailey recorder is a receiver-recorder for pneumatic and electric transmission systems in power and process plants. It will record any measured variable which may be converted to pneumatic or electric signals. (72)

● Page's new medium weight 3/8 to 3 yd. capacity dragline bucket will dig sand, loose gravel, dirt, clay, or any material free of stumps and boulders. It's knife-edged lip and replaceable teeth are cast of high manganese steel to withstand shock and abrasion. (71)

● A special-purpose batch body is announced by the Galion Allsteel Body Co. It is designed for use in delivering measured quantities of cement and aggregate to concrete mixers on highway construction projects. (73)

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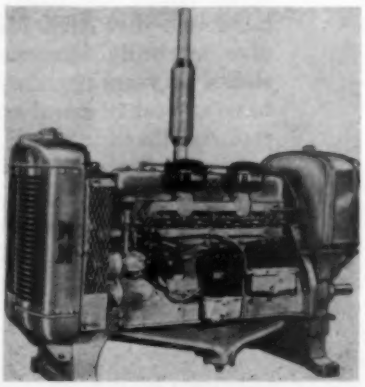
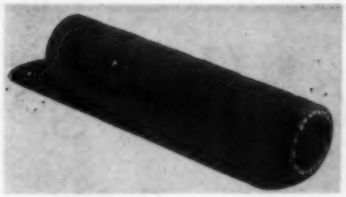
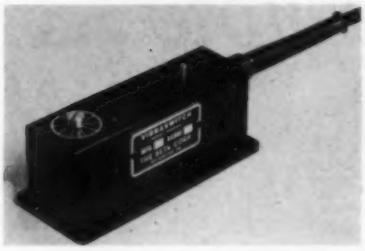


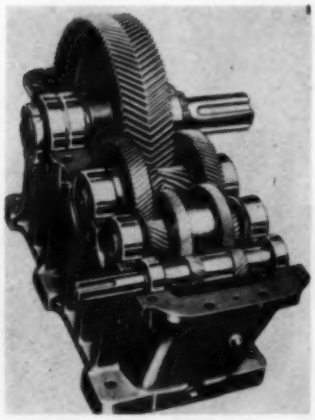
● Latest developments are incorporated in the new Minneapolis-Moline diesel engines. Both the four-cylinder and the six-cylinder models have a 4½-in. bore and 5-in. stroke, and feature energy cell combustion. (74)



● Hamilton's new Revelation air hose is made from high-tenacity Cordura rayon cord which is thoroughly impregnated with a rubber cement and braided under tension on steel mandrels. (75)

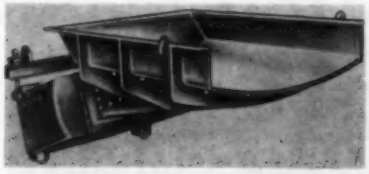


● By eliminating the need for expensive amplifiers and other auxiliary equipment and thereby drastically reducing overall cost the Vibraswitch brings quality excess vibrations monitoring to smaller installations. (76)



● Both high speed and intermediate shafts of Herringbone gear reducers are euipped with Rollway cylindrical roller bearings of the precision type. Intermediate shaft speeds may be as low as 1 rpm. (77)

● Lincoln's Selfweld, a 100 ampere welding machine, incorporates a new design which enables operators of lesser skill to easily weld many types of metals. As can be seen by the picture, welding can be done without touching any of the components. (78)

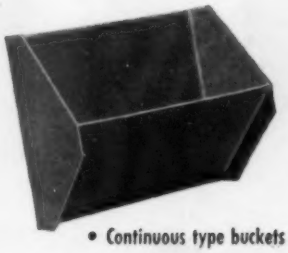


● A new heavy tonnage vibratory feeder has been announced by the Syntron Co. It is equipped with a 54- x 72-in. flat pan trough and has a maximum feeding capacity of 750 tph of bulk materials. (79)

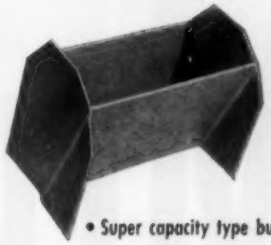
● This Miller wedge fitting is designed to speed hook up and save head room. The quick connecting fitting common to single line hoisting is right in the body of the swivel. (80)

RUGGED AND DEPENDABLE AT low cost

• Salem type buckets



• Continuous type buckets



• Super capacity type buckets

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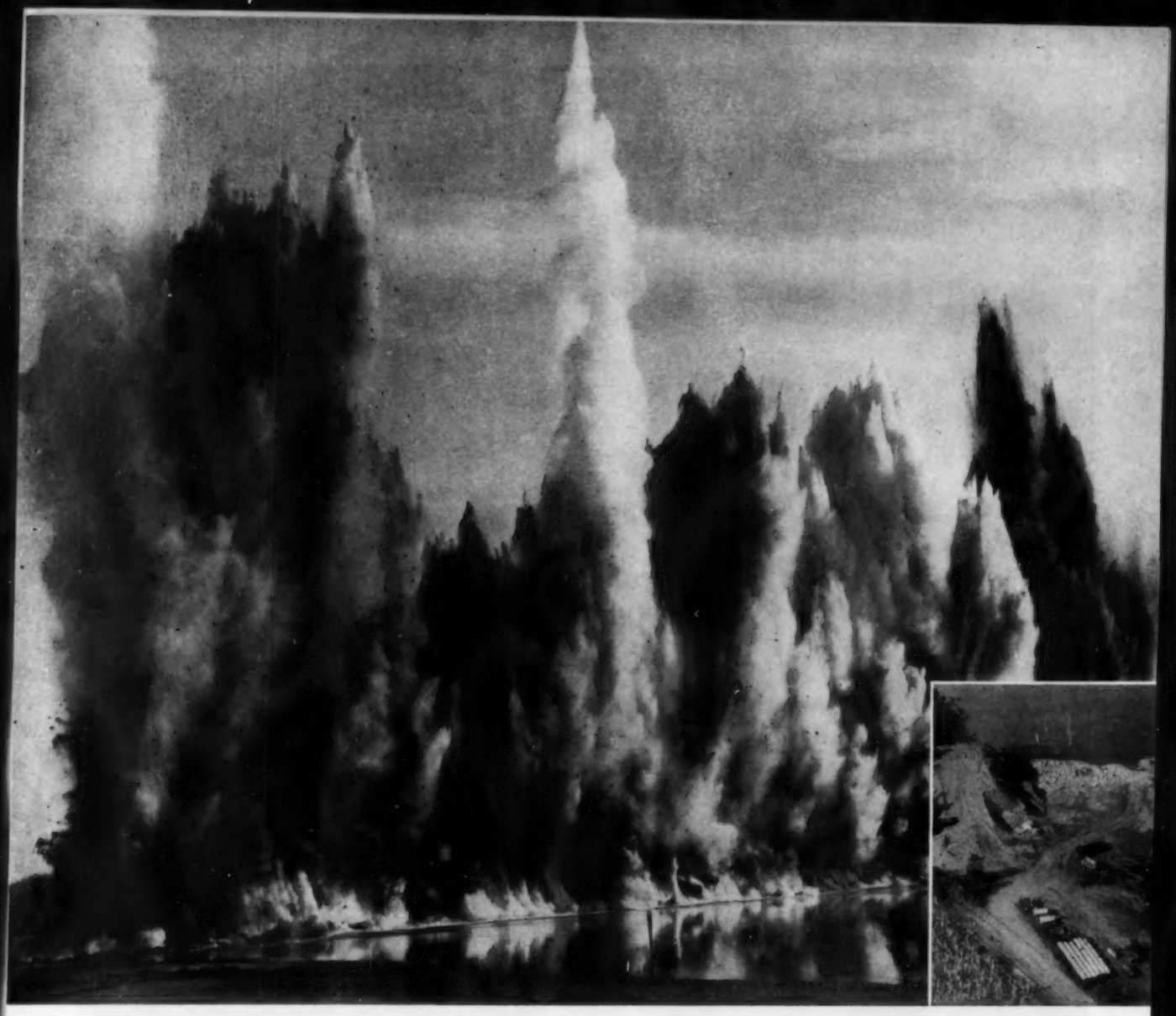

WHEN PIPELINES CROSS WATER

explosives research pays off

The tremendous power of dynamite, skillfully and ingeniously handled, made it economically possible to cross the wide, deep Tennessee River (inset above) with two parallel pipelines, 50 feet apart. Trenches blasted underwater through hard red clay in the shallows, and lime rock in the 40-foot-deep channel, opened the way for speedy dredging operations . . . another example of the efficiency of modern explosives and blasting methods.

Hercules' research in the pioneering and development of explosives and our extensive service facilities are available to help you in solving blasting problems on construction jobs or in mining and quarrying operations.

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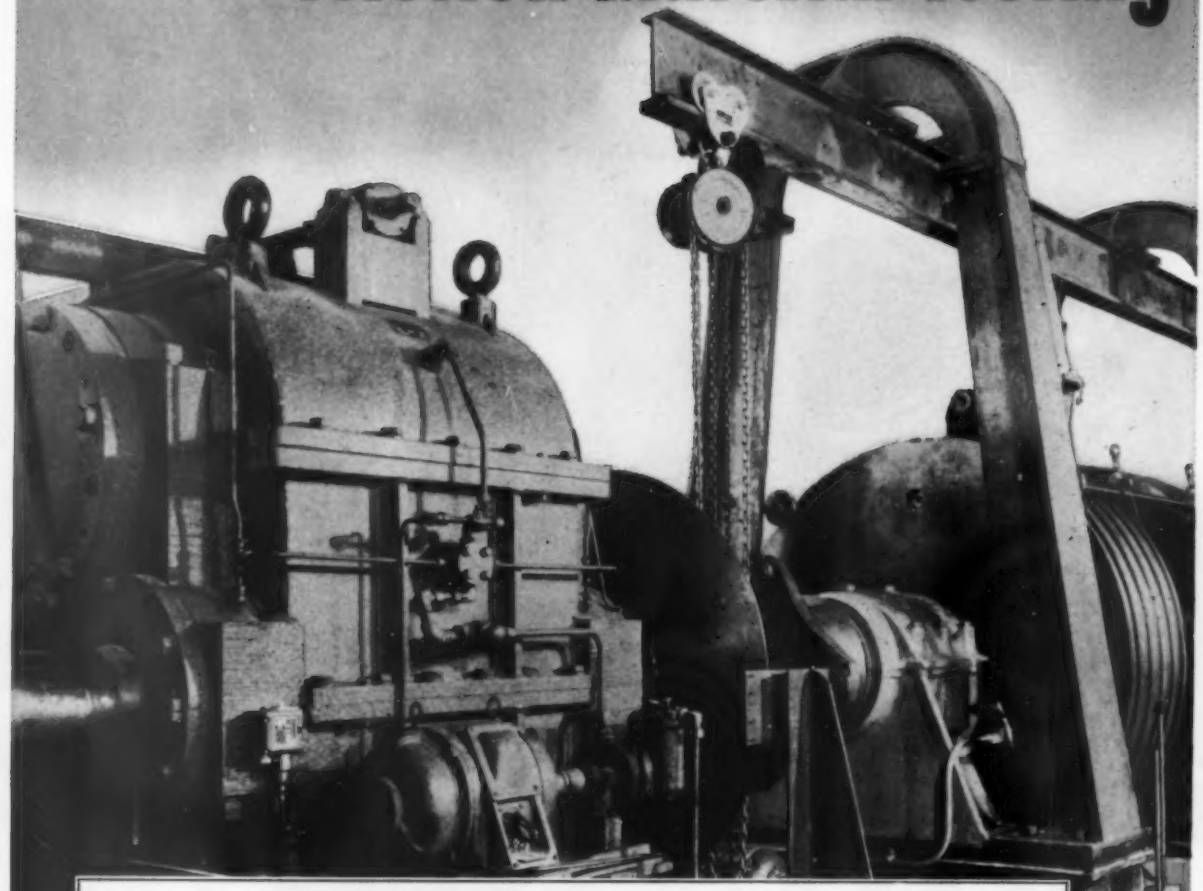
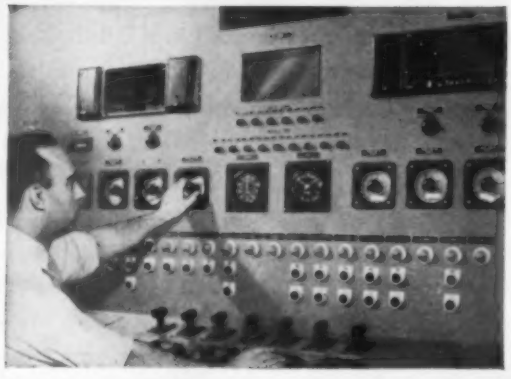
XR54-6

World's largest dynamometer Friction Material Testing





This new dynamometer—rated at 51,000,000 ft. lbs. K.E.—is the largest ever designed exclusively for evaluating friction materials.

Built with the precision of a fine watch, it consists of a driven shaft carrying adjustable flywheel discs. In operation, the huge flywheels are rotated at controlled speeds by means of electric prime movers. On reaching predetermined speeds a test brake lining or clutch facing cuts in to absorb the energy in the flywheel assembly.

The flywheel weights can be varied to match the inertia load of the widest range of vehicles—from light automobiles to the heaviest bus, truck, plane, machine or earth moving unit.

An electronic instrument panel automatically cycles the starts and stops during operation and at the same time accurately computes and records torque, deceleration, brake input and temperatures.

Johns-Manville *asbestos*

designed for installed by Johns-Manville

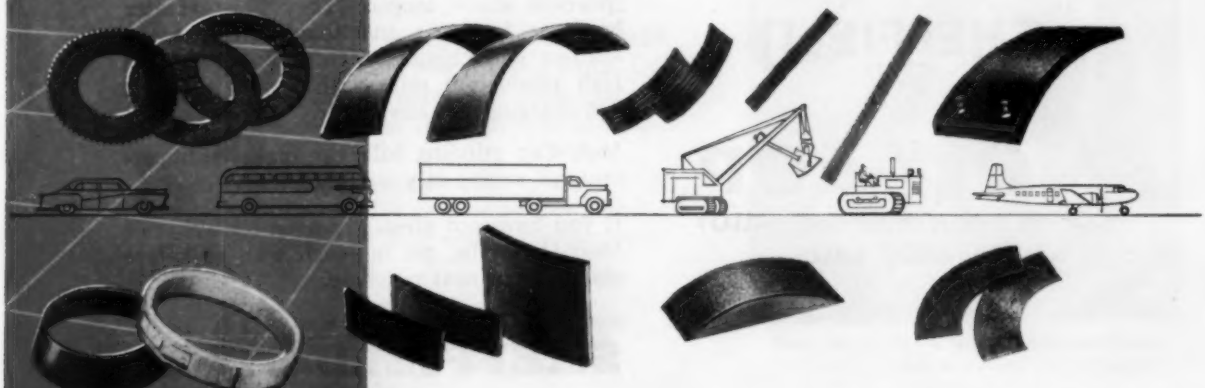
Johns-Manville engineers and scientists unveil new research facilities especially created for the development of high performance J-M Brake Linings and Clutch Facings

THIS HUGE inertia dynamometer—*left*—is only one of the many outstanding features of the new Johns-Manville laboratory at Manville, N. J. Along with other precision units, its research facilities promise completely new standards for measuring and improving the effectiveness of friction materials of every type and for every purpose . . . now and for the future!

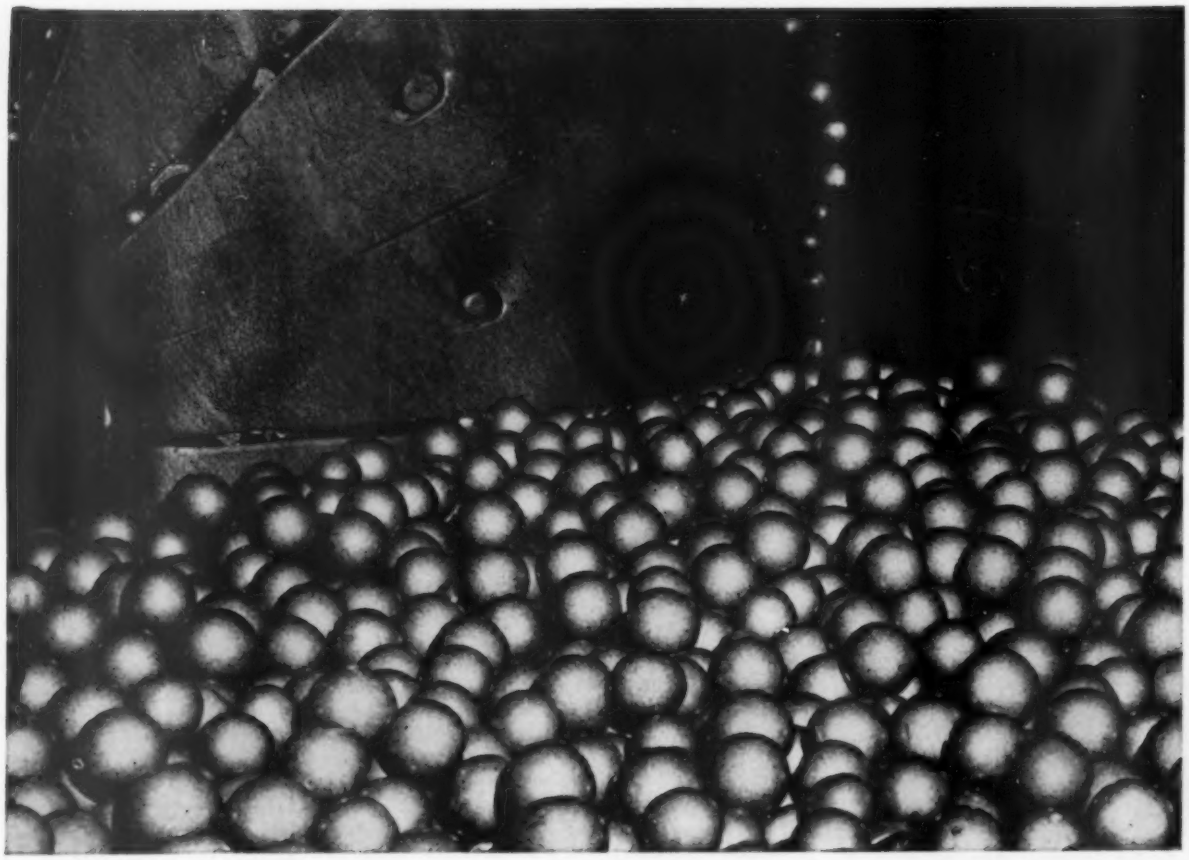
Whether the problem involves checking the clutch of a small power mower or a huge diesel shovel—or the brakes of a car, bus, truck, machinery or plane—the sensitivity and accuracy of this new equipment broadens the opportunity for the investigation, evaluation and development of high quality, high performance J-M Brake Linings and Clutch Facing.

The recognized leader in Friction Material development for 70 years, today Johns-Manville produces materials that are specified and used as standard original equipment on many leading makes of new automobiles, trucks, buses and industrial units. They are economical and dependable . . . provide stabilized friction for longer periods under grueling pressures and temperatures, withstand heavier shock loads and faster rubbing speeds.

The Johns-Manville engineering staff and the world's best equipped friction material development laboratory are at your service. Your Johns-Manville representative will gladly tell you more about this service . . . or write to Manager Automotive Division, Johns-Manville, 22 East 40th Street, New York 16, N. Y.



FRICTION MATERIALS JOHNS-MANVILLE JM PRODUCTS



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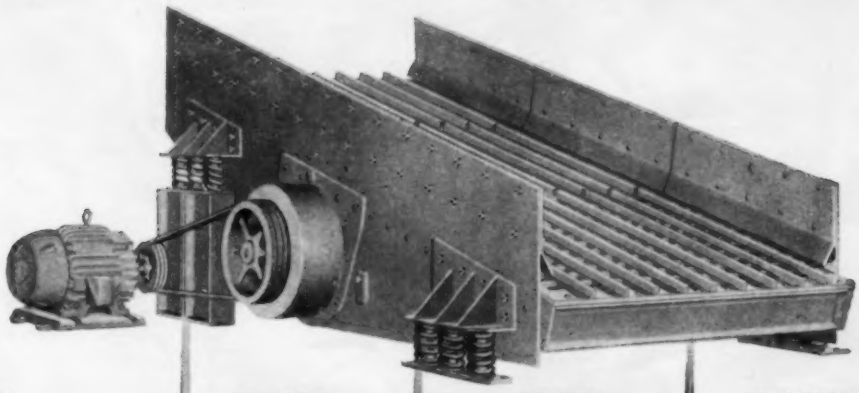
Heavy-duty scalping's BIG 4

..your assurance of top performance



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Massive frame utilizes heavy-section ship channels and H-beam members. Welded deck is securely riveted to thick side plates. This stress-relieved construction easily withstands up to 40-in. boulders dropped from feeder.

2 HIGH CAPACITY

Efficient vibrator mechanism permits screening extremely high capacities of sticky ore. Deck can be perforated plate or grizzly.

3 EFFECTIVE SEPARATION

All vibration is isolated from foundation by large, square-end helical springs and concentrated in the live deck for thorough action of the deepest bed.

4 TROUBLE-FREE OPERATION

Automatic controls limit motion during acceleration and deceleration. Over-size, self-aligning, taper-bore roller bearings with hydraulic bearing removal device insure long life and ease of maintenance.

New LINK-BELT vibrating screen combines all the features essential to low-cost scalping

HERE'S the ruggedness of a grizzly teamed with the proved efficiency of a vibrating screen. Developed by Link-Belt to meet every requirement of heavy-duty service—it's the ideal answer for run-of-pit applications.

Your Link-Belt representative can give you complete information on this new heavy-duty scalping screen. Contact him today, or write for your copy of Folder 2461.

Note the size of the large boulder handled by 5 x 4 ft. Link-Belt heavy-duty scalping screen.

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13.324-A

A striking panoramic view of the Steilacoom operation of the Pioneer Sand and Gravel Company. In the far middle distance the tower excavator can be seen at work on the high bank of the pit. In the foreground is Puget Sound.

Pioneer's Steilacoom Pit Has Largest Unit Excavator

THE Pioneer Sand and Gravel Company of Seattle, Wash., recently put into operation in its Steilacoom, Wash., pit what is claimed to be the largest single excavating unit of any kind ever used in a gravel pit.* The deposit in which it is working was left by the Nisqually glacier as it receded into the mountains. It is probably one of the most extensive pits, considering its concentrated depth and area, to be found in this country. In the last 50-odd years of continuous operation, over 20,000,000 cu. yd. of sand and gravel have been taken from the pit. Pioneer's current schedule calls for the production of more than 4,000,000 tons annually of four grades of sand and six of gravel. Most of this aggregate is moved by barge from the plant near the south tip of Puget Sound, to points on the Sound, particularly Seattle, where the company's distributing plants are located, and delivered by a fleet of about 100 trucks.

The 150-ft. high bank of the deposit is being worked with a Sauerman tower excavator. This has a 12-cu. yd. scraper bucket, operated from a truck cable spanning some 700 ft. between movable head and tail towers located at the base and top of the face. The pit was formerly worked with a 5-cu. yd. power shovel which worked off the "toe" of the steep bank. Material is now taken from the top of the bank and moved down the long, stable slope to the hopper with the help of gravity. The scraper is powered by three separate hoists for tensioning the track cable, for haulage, and for pullback. Operations average 300 ft., with a maximum reach of 675 ft.

The bucket, a Sauerman Crescent drag scraper, is designed with flat, smooth curves and planes, to permit its movement through the material with the minimum of friction and power consumption. At one time, when the diameter of the inhaul drum was increased to raise

*See PIT AND QUARRY, February, 1938, and January, 1945, for descriptions of other equipment used in this operation.

the inhaul speed of the bucket, production rose 25 percent, but watt meter records on the motor showed no increase in power consumption. The bucket is attached to a four-sheaved carrier riding the track cable, which can be tensioned to raise it, or slackened during periods of digging. Horizontal movement is by means of cables, the backhaul speed being 800 f.p.m. and inhaul 300 f.p.m.

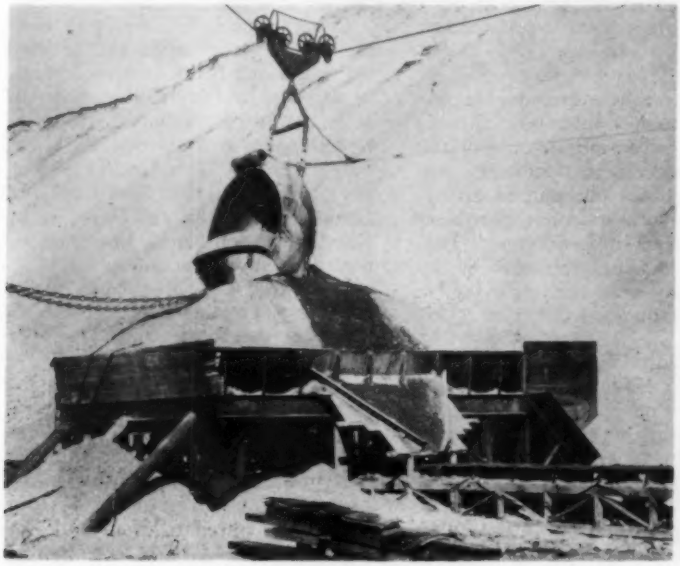
All cables work through sheaves at the tops of the 90-ft. head tower and the 50-ft. tail tower. Unlike tower excavators designed for strip mining (where mobility is important), these towers are counterweighted and mounted on railroad trucks resting on rails. As digging progresses, these rails are picked up and relaid, tractors moving the towers simultaneously a like distance along the face for the next series of digging. Under this system of working, the pit gradually assumes the shape of a smooth, half-bowl.

When the track cable is tensioned, the scraper is picked up above the material for returning to place of digging or any position desired. After the scraper is in position for digging and moving of material, the track cable is slacked off. The operator, located in an elevated cab outside the head tower, can easily spot the bucket, within the limitations of the reach, anywhere along its path between towers. He can therefore choose the most advantageous digging points with respect to the quality of materials, required proportions of fine and coarse, caving characteristics at various points, etc. The long span permits great flexibility of operation. By digging in close to the hopper, capacity can be increased for short periods; and by lengthening the haul, the pit can be cleaned up during slack periods.

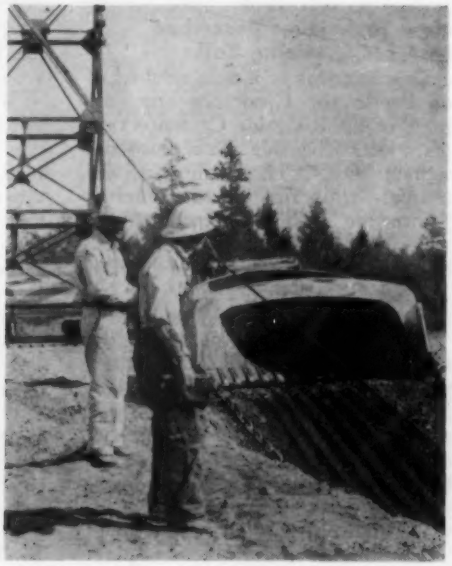
Using the stated production figure of 450 cu. yd. an hour with 12-cu. yd. loads, the average cycle of 37½ passes per hour allows 60 seconds for inhaul, 12 seconds for dumping, and 24 seconds for backhaul, from the average digging point 300 ft. out from the head tower. The material is discharged into a hopper and carried on field belt conveyor systems to the processing plant at

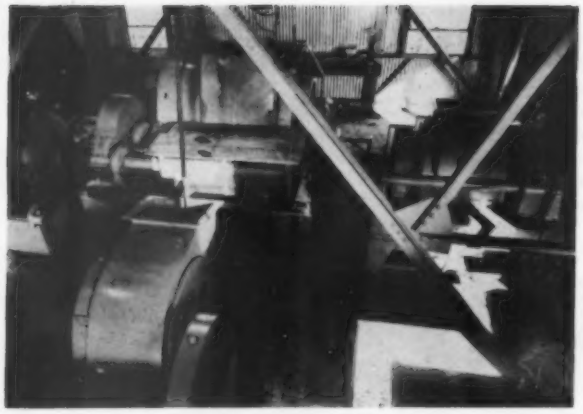
A comprehensive view showing the deep face of the deposit being worked with a tower excavator and a 12-cu. yd. bucket, digging from the top of the 150-ft. high face. A 675-ft. reach is provided by the 90-ft. head and 50-ft. tail towers.

Below: The 12-cu. yd. drag scraper dumps a load of material into the hopper. Note the flat, smooth curves of the bucket, designed to move through the material with the minimum of friction. Movement of the bucket is by three separate hoists, for track cable tensioning, for inhaul, and for backhaul.



Below, right: George D. Christensen, superintendent of production and processing, and H. A. Lithgow, assistant superintendent, standing before the tail tower at the top of the deposit face, watch the 12-cu. yd. bucket starting a new cut.





Interior view of the hoist house, showing the track cable tensioning hoist with motor in the foreground. In background are the inhaul and outhaul drums and a 500-hp. motor (left). The floor is concrete. Provision is made for all but major repairs.

Closeup of the head tower (front quarter view). The operator's cab in tower (right), containing all hoist control equipment, with necessary safeguards against overload, etc. Control of hoist clutches and brakes is by air power.

the water's edge. This processing plant requires for washing, 2,500 g.p.m. of water, enough to supply a city of 20,000 people.

Housed within the head tower are all facilities for operating the system and providing for sufficient working space for any but major repairs. The inhaul and outhaul hoists are powered by a 500-hp. rotor-wound motor; the cable tensioning hoist has its own motor. An air compressor supplies power for control of hoist clutches and brakes; flood lighting equipment is placed at the top of the tower for night operation of the pit. The operator's cab is mounted high at the side and contains hoist control equipment, with all necessary safeguards against motor overload, etc. All this equipment, plus maintenance tools, supplies, and a concrete floor, helps to counterweight the tower for stability at maximum cable loads. The tail tower, built of structural steel in a strong, triangular section, has a heavy concrete counterweight.

Safety was a main consideration in deciding to operate the bucket from the top of the bank downward. The result of this arrangement is that the material always assumes its natural angle of repose; it thus prevents the material from sliding, and also provides clearance for the operating cables. Another advantage of forming a stable slope, is that no machinery except cables and buckets is ever exposed to burial from a cave-in. Both towers are set back a sufficient distance from the working area of the face so that the operators and equipment are out of danger, should bank cave-ins ever occur.

Pioneer Sand and Gravel Company, now one of the largest operators on the West Coast, was formed in 1907 by the amalgamation of three competitive producers who worked the same deposit until litigation with one of the railroads, whose rights crossed the pit, brought them together. Gordon N. Scott is president of the company, and George D. Christensen is superintendent of production and processing at the plant.

New Techniques Described In A.I.M.E. Mining Talks

Development of a new method of mining in the Crestmore limestone mine of the Riverside Cement Company near Riverside, Calif., was described by R. H. Wightman, the company's superintendent of mining, before the Mining Branch of the American Institute of Mining and Metallurgical Engineers at its Los Angeles fall meeting, held October 7 and 8 at the Biltmore Hotel.

Block caving had been used in the Crestmore workings for about a quarter-century until the system was abandoned early in 1954 in favor of a modified room-and-pillar method, now under development. Access will be by way of a tunnel spiraling downward on a 10 percent grade. Meanwhile, the old Jensen quarry about 3 miles distant from the cement plant is again being worked to supply stone for the kilns until the new underground workings get into production.

Modern analytic instruments save time and money in mining, just as they do in other industries. For this reason, a wide increase in instrumentation is certain to result in an advancing mineral industry, Ken Kendall of Beckman Instruments, Inc., Fullerton, Calif., declared in his technical paper enitled *Advances in Instrumentation for the Mining Industry.*

The rapidly increasing use of sulphur in our modern industrial economy points up the continuing need for evaluating new methods for recovering the mineral. How important these methods are was the subject of a technical paper by B. H. Holt, J. H. Jensen, and J. W. Klohr of the Ralph M. Parsons Company, Los Angeles.

Other papers of interest to nonmetallic minerals producers included the following: *Belt Conveyor Systems in Mining,* by Clay Colley, Los Angeles consulting engineer; *Radioactive Deposits of California,* by H. G. Stephens of the U. S. Geological Survey; and *Notes on Sampling and Evaluation of Mineral Deposits,* by G. Austin Schroeter, Los Angeles consulting mining engineer.

The two-day meeting closed on the evening of October 8 with a dinner-dance in the Renaissance Room of the Biltmore.

American Sulphur & Refining Company, Beverly Hills, Calif., plans to erect a $500,000 plant at Sulphurdale, Utah. The concern is leasing property there and also has an option to purchase the land for $600,000.

Idaho Firm Adds Processing Plant To Produce Natural Pozzolan

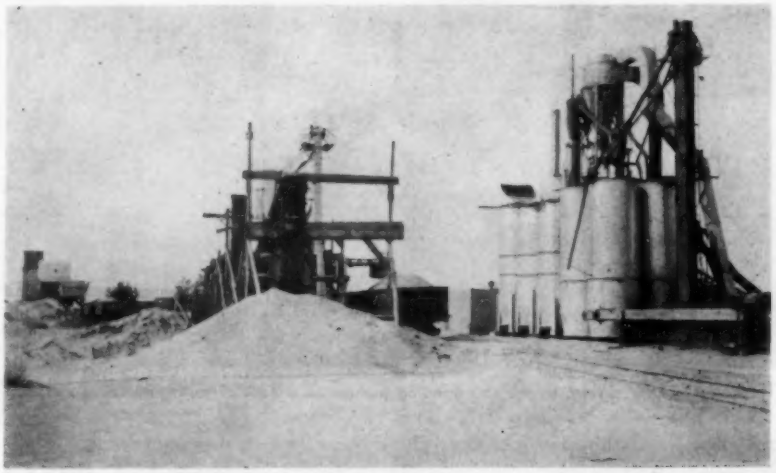
another ON THE SPOT report

FOR several years one of the country's foremost producers of high-grade granulated pumice, which ships the bulk of its output in the form of concrete-block aggregates, Pumice, Incorporated, Idaho Falls,

By HARRY F. UTLEY

Idaho, has just completed a new department at its Ammon, Idaho, plant to process minus 325-mesh material in the form of a natural pozzolan.

The desirability of utilizing pozzolan as a replacement for 20 percent or more of portland cement in concrete has been demonstrated by the Bureau of Reclamation and other agencies in recent years in the design of concrete mixtures for use in large dams and other structures. Heretofore, however, commercial production of natural pozzolan of the required quality and fineness was non-existent; so the need had to be met by shipping by-product fly ash thousands of miles by rail to the construction sites. When the Ammon plant gets into full production, it will be able to supply 25,000 to 50,000 tons of the finely-ground natural pozzolan annually, according to Robert L. Milner, president.



A view of the Pumice, Incorporated, operation at Ammon, Idaho. At the left is the old aggregate-to-preparation plant; at the right, the recently completed facilities. The ten silos store products of the drying and grinding plant.

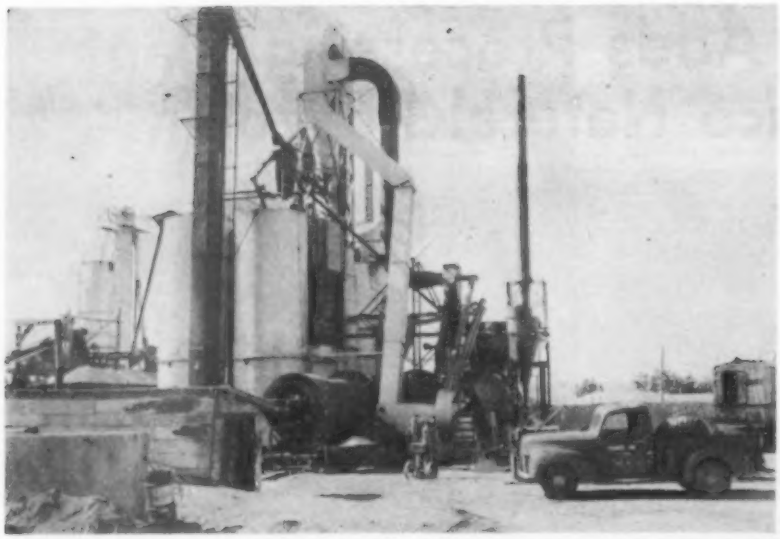
Mr. Milner is a veteran of 15 years' experience in the production and use of pumice as a lightweight aggregate. In the late thirties he established his initial contact with the material when he engaged in the sale of pumice blocks. In 1943 he established his own concrete-products plant (Cinder Products Company) at Jerome, Idaho. At the start, the plant employed volcanic cinders mined at the "Craters of the Moon" as its lightweight aggregate; but dissatisfaction with the performance of the aggregate set Mr. Milner to investigating a small pumice deposit he then owned on the eastern edge of the Snake River Plain in Bonneville County, Idaho. Tests indicated that the material was ideal as a lightweight block aggregate. Accordly, in 1944, he established a simple crushing-and-screening plant and opened up a pit to provide for the needs of the Jerome block plant.

Further exploration of the area revealed the existence of a vast reserve of pumice. The purest and most desirable is concentrated in a strip approximately 7 miles long and about 2 miles wide, which contains at least 25,000,000 tons of desirable material. The pumice is clean and uncontaminated, tightly packed, pure white to light gray in color, free of bentonite, containing only an occasional trace of other clays.

Although Mr. Milner is still financially interested in the block business —his present plant investment being in the Pumice Products Company of Boise—he early recognized the ultimate value of the pumice reserves in Bonneville County. In fact, he sold out his interest in his original block plant at Jerome several years ago to invest the proceeds in the acquisition of the 4,000 acres or so of pumice he and his company now own or control.

The plant at Ammon, about 5 miles east of Idaho Falls, is served by the Union Pacific Railroad. The present pit is about 5 miles from

One of the large-capacity trucks being loaded by a shovel in one of the pits, east of Ammon.



The new plant for drying, sizing, and grinding pumice to minus 325-mesh pozzolanic material.

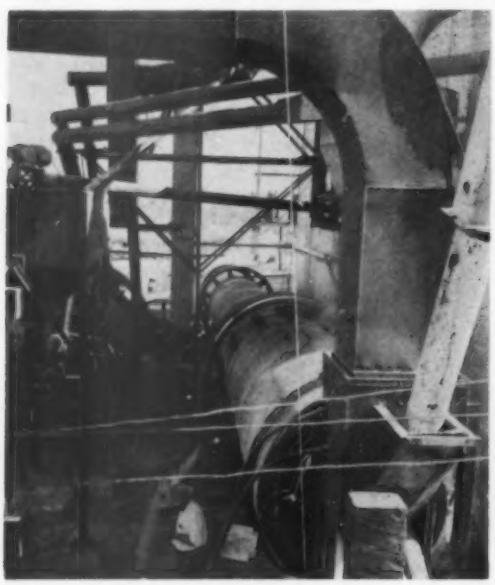
This "V" screen, consisting of a vertical mesh cylinder which both rotates and vibrates, removes extreme fines in the old block-aggregate preparation plant.

the plant, and dump trucks, loaded by an Osgood 1½ cu. yd. shovel and a Lorain ¾-cu. yd. diesel machine, are in daily service except in the dead of winter, building up a stockpile of pit-run pumice to supply the year-'round needs of the plant. A surplus of 20,000 tons or more is usually in the surgepiles by late fall, when the weatherman declares a halt in pit operations.

The primary plant at Ammon is devoted principally to the production of concrete-block aggregates. Top size of the pit-run material seldom exceeds 1 in., and this is reduced to the maximum of ⅜ in. by a set of high-speed rolls and sized by a Symons vibrating screen. Demand from block producers falls into three general ranges—minus ⅜-in., minus 5/16-in., and minus ¼-in., these being screen products. Extreme fines can be taken out by a Symons "V" screen in the circuit. This type of screen consists of a vertical screening cylinder which both rotates and gyrates, in effect enabling the plant to operate flexibly in open circuit without the re-circulating load that would be required if the crushing and screening circuits were closed. Finished aggregate is loaded by belt into open-top cars; these are moved along by a cable and winch which the operator handles electrically by remote control from his station in the plant.

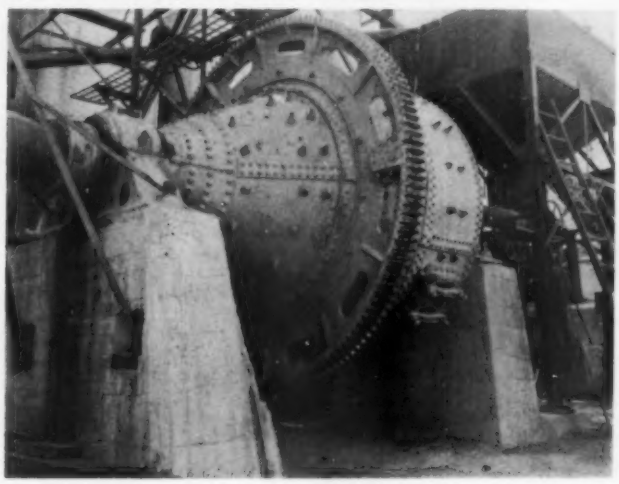
The new plant, which ball-mills the pumice to produce minus 325-mesh pozzolan for concrete, has been in partial existence as a drying, sizing, and classifying operation for about a year now. It has been producing "bone-dry" pumice in six sizes from ¾ in. down. Closed storage of the product is achieved in a battery of 10 steel silos, or tanks, with a combined capacity of 700 cu. yd. Primary screening of the pumice is being delegated for the first time this year to a set of four Tyler screens with electrically-heated cloth. The oil-fired 5- by 60-ft. rotary dryer is brick-lined for 6 ft. at the firing end, the remainder being protected and insulated with an applied inner lining of pumice concrete. Maximum

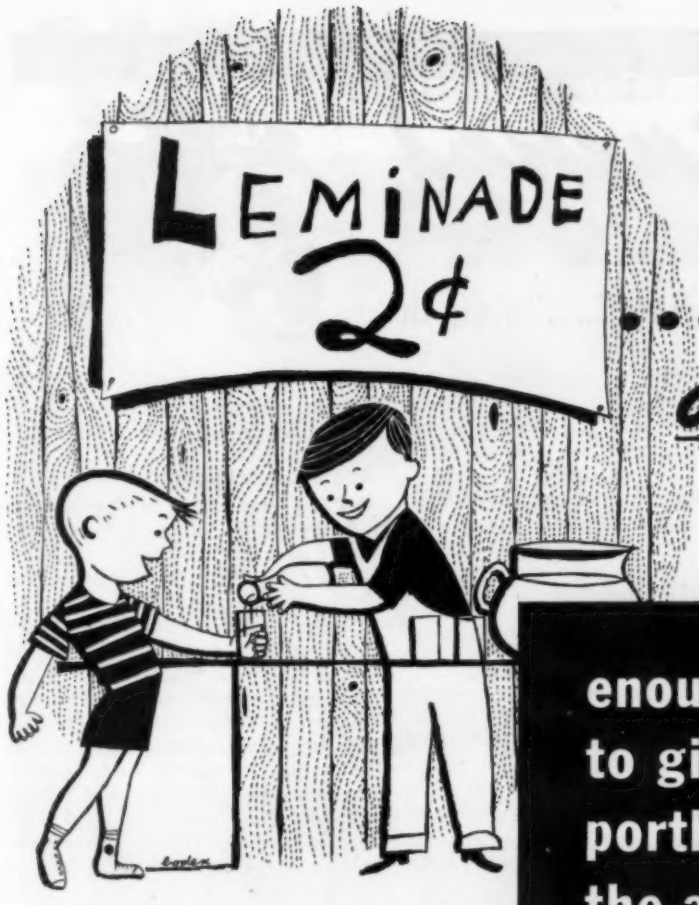
(Continued on page 86.)



Left: The rotary dryer, from the feed end, and the ball-mill.

Below: An 8-ft. conical ball-mill, operating in closed circuit with air-separators, does the fine grinding in producing pozzolan.





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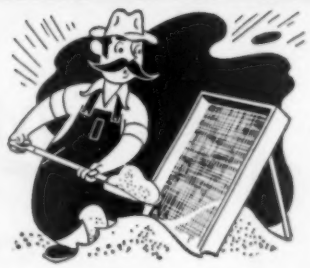


by Ray L. Smith, Jr.

IT'S time your old Ed points out that this department is strictly not a one man operation. We've had sufficient response to encourage us to continue, but we sure would like a little help.

431 South Dearborn Street, Chicago 5, Illinois. That's the address. Now be a "talent scout" and send on any bit of frivolity of your own that pushed a button, or anything else you happen to see, good or bad, that might be used as copy in some future issue.

You see, if we print only jokes, people say we are too silly; if we don't, they say we are too serious. If we clip things from other publications, we are too lazy to write them ourselves; if we don't, we're too fond of our own stuff. So send in your contributions, quick like a bunny. Then we can all appreciate true genius.

A Saga in Gravel

A FEW mornings past, our post-office box coughed up the following hullabaloo on how a built-in surf can roll merrily into your living room in the form of a $55 ocean-making machine.

This exotic seashell, 15½- by 10- by 7½-in., in mahogany motif, has a hidden cylinder that spits gravel against a drum. You folks will now forget all about the Maine inlets or Miami Beach as you discover the AC-DC Atlantic Ocean that plugs right in next to the toaster and ironing board.

Gone are the expensive visits to far away crowded beaches when you own the Electronic Slumber-E-Sea and can bring the Atlantic City surf into the rear of your top floor apartment at the push of a little button.

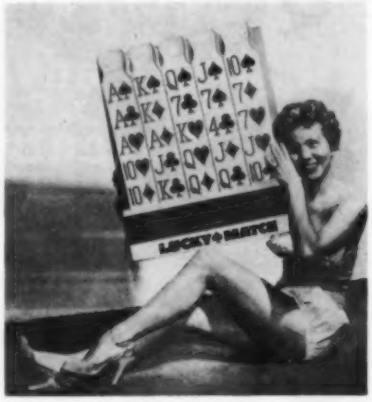
You say you want more for your money? Well allright. Just lug Junior's sand box up to the top floor.

Now, while lying down in the sand, imagine the ocean really lies beyond those sordid walls. You plug in Model FFN-33, snap the switch to Rising Waters, fall back on the sand and imagine. The flick of another button lights up the front of the thing. There you see (1) surf in neon illumination, (2) a moon in the sky and (3) electrically waved palm trees.

The engineering principle behind Slumber-E-Sea is an electronically controlled cylinder filled with gravel, sand and choice pebbles. Heck, this stuff could come from any darned old beach.

Incendiary

MAYBE not, our blinkers aren't what they used to be before TV, but the lady herself spells temperature forward, backward, sideways and all around. We can only agree that she's a pretty neat dish,



at least, that's what the Leprechauns are hissing into our ear.

Incidentally, the book of matches the young miss has in her hands was brought out to take advantage of our natural "gambling instincts." On each stick is printed a complete poker hand. Players select sticks from the book and compare hands as in a regular poker game. Real Solid.

A Screened Pass

IT seems the Pennsylvania Dutch have a tradition that before the coffin is lowered, a friend steps forward and says a good word for the deceased. But tradition was in peril when stingy old Jacob departed. For a while nobody could think of anything good to say. But finally one of those present muttered: "Vel, you can say this for Yacub. He vasn't always as mean as he sometimes vas."

The Success Family

YOU may want to put in your scrapbook, for some future use, the following description of "The Success Family." It could be tucked in a corner of a bulletin.

"The father of success is Work; the mother is Ambition. The eldest son is Common Sense. Some of the boys are Perseverence, Honesty, Enthusiasm and Cooperation. The eldest daughter is Character; some of her sisters are Cheefulness, Loyalty, Economy and Courage. The baby is Opportunity. Get acquainted with the old man and you will be able to get along pretty well with the rest of the family."

Our great dane, Cleo, however, being allergic to labor, is not impressed by the above quotation. Her lifework is insulting the horses and ducks around the farm. We must some day remember to read her the old Indian prayer, "Grant that I may not criticize my neighbor until I have walked a mile in his moccasins."

Whose Kid Has the Measles

GOOD copy is good copy, whether it be in a newspaper, a magazine, or an ad. At least half the secret is imagination and a sense of humor. Nothing that we have read recently is more enjoyable than the following quote of a visiting Englishman—"odd names your American towns have, Hoboken, Oshkosh, Walla Walla." The American agreed, and asked his guest if he spent all of his time in London. "Oh, no," he replied. "About half in London and half in Biggleswade - Snorkon and Leighton-Buzzard-on-Upper-Little-Topping."

But no matter what you call it—Turkey, Fowl or Gobbler—We hope you eat plenty and have a wonderful time on that very special day which comes shortly after you get this copy of your favorite magazine.

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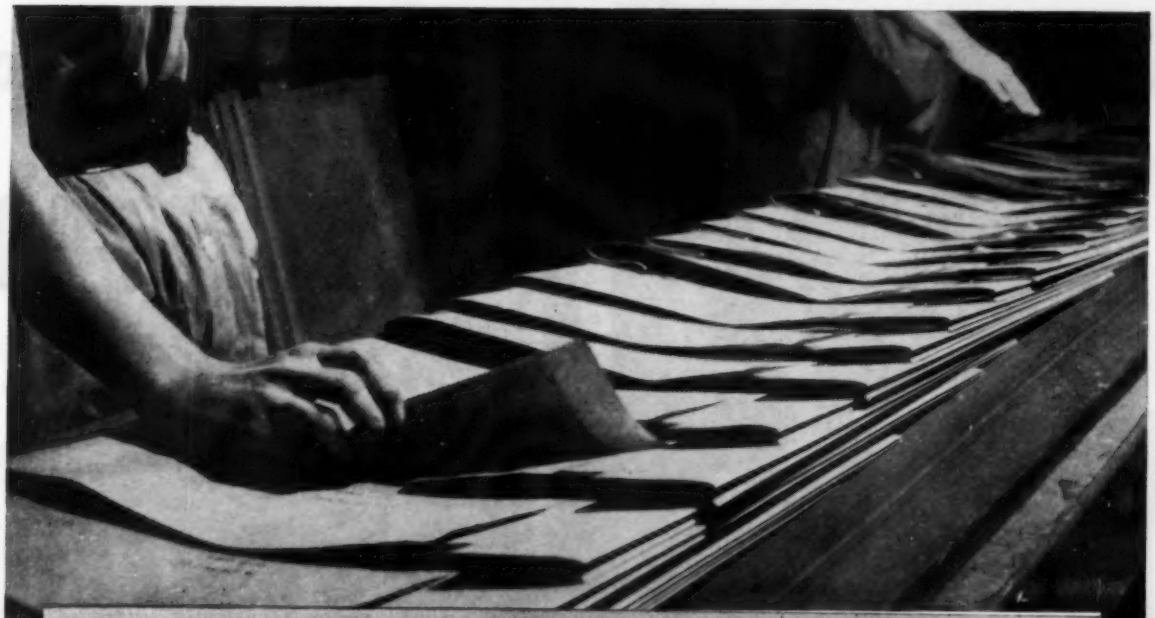

Inspection of newly tubed bags just before bottoming operation. Careful inspections mean better bags for you.

Inspection of finished pasted bags. Because these pasted closures must stand great weight and shock, special care is taken to see that all surfaces are absolutely bonded.

Final inspection of sewn-valve bags. Specially-trained inspectors examine every bag before it moves to the baling machine.

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Two of the three 4' x 12' TELSMITH Pulsators

Making base rock and oil rock for the Baker Homestake Highway, this plant of the Newport Construction Co. at Baker, Oregon, averages 125-150 yds. hourly. All fine crushing is easily handled by one 48" FC Telsmith Gyrasphere. Two of the plant's three 4' x 12' Telsmith Pulsator screens, trailer-mounted and placed atop a portable bunker, are making finished sizes. The third is used as a scalper. Mr. Marshall Newport says he is "very happy" with Telsmith performance.

Send for Bulletin 266.

Q-28

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Marens Eqpt. Co., New Hudson, Mich. • Rish Eqpt. Co., Cincinnati 14, & Portsmouth, O.—Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. Robert S. Bailey, 816 W. 5th St., Los Angeles 17, Calif. • Minne Eng. & Eqpt. Co., San Francisco 4, Calif. • Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash.

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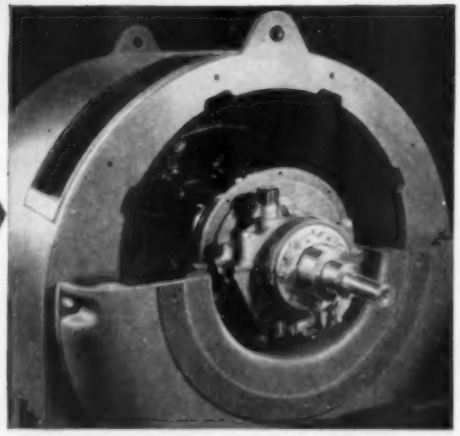


* New Allis-Chalmers slip-ring motor with inspection cover and upper half of end shield removed. Note accessibility of brushes, protection of bearing.

ALLIS-CHALMERS LARGE SIZE SYNCHRONOUS AND WOUND-ROTOR MOTORS have been completely redesigned with longer stator yokes and shorter end shields. Collectors and brushes are located inside the yoke for protection against physical damage, dripping moisture, dust and dirt.

Capsule-type bearings give better bearing protection, too. The upper half of the end shield may be removed for inspection or cleaning of the interior of the motor without disturbing the exciter or exposing the bearing to the ravages of dirt, dust and oil contamination.

All leads enclosed — Both primary and secondary winding leads are brought out through separate conduit boxes. There is no loose wiring . . . no exposed leads anywhere.

Easy maintenance — Even though the new design offers maximum protection to brushes and collectors, internal parts are fully accessible for inspection and maintenance through large openings in the stator yoke. Opening covers are readily removed and are secured during operation by easy-operating, self-locking fasteners.

Get details now — This new design is available from approximately 250 hp at 300 rpm and up, in drip-proof and splash-proof construction. Call your Allis-Chalmers representative for complete details or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183. A-4464

ALLIS-CHALMERS

Technical Considerations In Natural Pozzolan Production

PART II

MECHANICS OF THERMAL ACTIVATION

Outstanding groundwork has been laid by such Bureau of Reclamation engineers as Mielenz, Witte, and Glantz in the testing and study of the behavior of natural pozzolans as

By WOLF G. BAUER
Consulting Engineer

a result of calcination. Many of their findings are of sound practical value, and they form a platform from which further variables and process techniques may be charted. Particularly in the reduction to practice in calcining methods and requirements there is yet much to be learned and applied. The writer has found that atmospheric conditions during calcining have significant effects on the properties of certain pozzolans, and the relationship of time versus temperature under simulated commercial calcining conditions in rotary pilot kilns point to critical conditions that will affect kiln design.

The table in Part I summarizes in generalized form the work of various investigators, and indicates the temperature ranges at which the various pozzolans become chemically unstable and reactive. It would appear that these natural materials can be made unstable and chemically reactive as long as the silica or silicate lattice has bound to it OH and H ions or H_2O molecules which can be spalled off by heat (excess vibration), thus leaving the lattice strained, slightly or completely rearranged, "porous", or electrically unbalanced. The science or art of activating, therefore, is to apply this disrupting heat at just the right energy level and for a sufficient length of time to leave the pozzolan reactive to calcium, sodium, and potassium ions, certain temperature levels bringing about preferential activity with certain types of materials. This condition hints at selective calcination possibilities in pozzolan design on a commercial basis. Practically all natural pozzolans, in which reactivity to lime can be induced or enhanced by heat, contain chemically bound water, ranging from up to 6 percent in the volcanic glasses to about 14 percent for some of the kaolin minerals. Removal of this water progressively reduces the index of refraction and density in most pozzolanic substances. Heating beyond an optimum temperature and time period will decrease reactivity due to re-crystallization, glass formation, and combination of reactive silica with other oxides and bases. Activation may therefore be considered dehydration with or without destruction of the original atomic network or crystal lattice.

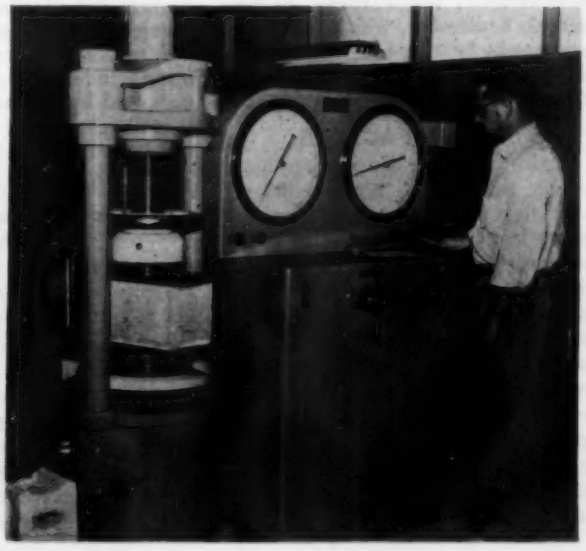
In heating rhyolite glasses, dehydration is virtually complete at 1000 deg. F. without disruption of the atomic "alignment". Above this temperature there is internal cell destruction. Some glasses show increase in reactiveness, and in some the activity is lessened. Generally, heating of glasses is not too effective. When the glass is, however, improved sufficiently to warrant the expense of activating, then a temperature below 1600 deg. F. has maximum effect on cementing strength. Temperatures above 1800 deg. F. induces increased activity toward alkalies.

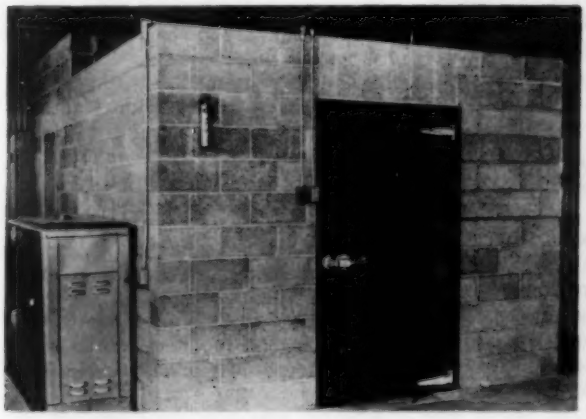
The opals in Group II are greatly affected by dehydration and calcination, the trend in relative temperature level effect being slightly reversed to that of Group I. Thus maximum cementing strength is developed near 1600 deg. F., while maximum alkali reactivity is produced nearer 1400 deg. F. Most of the combined water is driven off below 1800 deg. F.

In Group III the clay minerals behave at some variances, the kaolinites developing good cementing strengths near 1200 deg. F., while bentonites must be heated to and above 1800 deg. F. The zeolites and montmorillonites are intermediate in this respect. All but the hydro-micas develop activity toward alkali in solution near 1400 deg. F., the latter

Right: Full-scale compression testing on pozzolan masonry concrete, as conducted in this laboratory, is a vital phase of control.

Below: A curing chamber which has full humidity control.





having again to be heated above 1800 deg. F. for maximum activity. Mixtures of these trend toward the predominant mineral, and the time-temperature profile of the calcination process may be adapted to specific pozzolan design.

Kaolinite gives up its structural OH and H ions (2 molecules of water) between 900 deg. and 1000 deg. F. in a very narrow temperature range, although some loss is noted below and above these temperatures. The crystalline structure is destroyed at near 1000 deg. F., and the kaolinite is changed into an amorphous form. Above 1800 deg. F. gamma-alumina has been identified by Mielenz, with transformation to mullite crystals as the temperature progresses.

Montmôrillonite minerals contain adsorbed H_2O molecules which are volatilized up to 950 deg. F., above which temperature most of the structural OH and H ions escape up to 1200 deg. F. and the lattice spacing in one direction diminishes until at 1600 deg. F. the structure becomes amorphous. The several bentonites behave somewhat differently during heating, depending on their base composition. Also their base exchange capacity is considerably influenced by the thermal history of the mineral.

The hydro-micas loose their adsorbed water molecules below 575 deg. F., and their structural hydroxyl and hydrogen ions below 1300 deg. F., with lesser changes in lattice spacing. Disintegration takes place at higher temperatures between 1600 deg. and 1800 deg. F.

The zeolites which often represent altered volcanic glasses vary considerably in their heating reaction. The lower silica minerals disintegrate at lower temperatures, as for example heulandite, which looses its structure by heating to 1000 deg. F., while clinoptilolite disintegrates mineralogically only above 1600 deg. F.

FINENESS FACTORS

Particle size, size distribution, and particle shape of all powders determine, to a large extent, the physical properties of the dry, moist, or plastic mass. Particularly is this the case with materials which are used in gaseous or liquid emulsions, pastes, or slurries. Lime, gypsum, cement, and clays are examples in this category, and their ability to absorb and retain water, their viscosity and plasticity, their cohesion, permeability, density, etc., is directly affected by the three variables of size, distribution, and shape of the individual fine particles. Whenever chemical reactions are involved, such as in the hydration of cement through stages of aqueous solution or within or between gels and adsorbed ions, the available reactive surfaces will obviously influence the speed of the sum-total reaction, as well as the time for final completion. This is well borne out in the case of portland cement in mortar and concrete, even though it leaves open to question the desirability of striving for extreme surface area per unit weight of cement as it affects water requirements, drying shrinkage, and strength gain throughout later ages.

In the case of pozzolans, however, this surface factor is extremely important, and a certain percentage of sub-micron-size material is generally beneficial and desirable. Since the early strength and speed of reaction of hydrating cements are increased with an increase in the fineness of grind and powder surfaces area (as evidenced in part by the finer particle size of high-early portlands), the slower reactive silicates of the pozzolans are especially benefited by high specific surface in order to allow beneficial replacements without unduly lowering the concrete strengths. While this holds true for most pozzolans that are ground to powder, the diatomites, which have a tremendously large reaction area in the form of thin-shelled diatom skeleton surfaces, are to be cited as the other extreme. Furthermore, as in the case of portland cement, the beneficial influence on later strength gain and also any continued neutralization of chemically detrimental forces obtained by and through the slower and later reactions with the coarser particle fractions are increasingly recognized. Design of pozzolan particle size distribution, *i.e.*, within economic power justification, is thus a function of its original reactiveness, grindability, and surface area produced by the nature of the particle shape, rather than by extreme number or minute size alone.

Fineness Evaluation Since the cementing action of pozzolans within the initial setting period of 1 to 3 months is probably confined to particles of less than 10 microns, the use of sieves for fineness index is of no more value here than it is for portland cement. Various microscopic, fractionating, sedimentation, air permeability, turbidity, and other even less direct test have and are being employed to arrive at a representative value of particle size and distribution as it may affect mortar and concrete. The Blaine permeability method, because of its relatively simple and short testing procedure, has found considerable favor for control work. While it does not represent an evaluation of particle size gradation, such as can be computed from the Wagner type turbidity method, for example, the relative resistance of the powder to air flow does allow comparative evaluations of pozzolans ground under similar conditions.

Most commercial pozzolans are ground to a fineness at least equal to that of Type I portland cement (but usually finer), values varying from 3,000 to 12,000 sq.cm./gr. specific surface except for the diatomite pozzolans, which inherently may reach 20,000 or higher. Mexico, which uses pozzolans in 15 percent of all concrete construction, specifies 2900 Blaine as minimum, most materials including pozzolan cements running well over this value. The Bureau of Reclamation specifies 3000 as the minimum for fly ash. Calcined opaline shale pozzolans supplied for Western construction have been furnished to above 10,000 Blaine values.

PROCESSING OF POZZOLANS

Space does not permit the detailed treatment of this subject at this time, but will be covered more fully in a later discussion in Pit & Quarry. The subject matter will be kept to a generalized level here.

Commercial processing of pozzolanic raw materials basically requires two phases, (1) that of heat-activating the raw material under optimum time-temperature conditions to adapt the pozzolan to a specific or to a maximum range of field use, and (2) that of size reduction and particle surface production by grinding and classifying. If activating is not a part of the process of manufacture, drying prior to grinding may be an additional phase. If the pozzolan is one of several materials to be blended into lime-pozzolan masonry cements or portland-pozzolan cements, proportioning and blending is an important process phase.

The pozzolan manufacturing plant may be a distinct individual operation embracing quarrying, the crushing and screening operation, pyroprocessing or drying, grinding and classifying, blending and storing, interplant transport, and packaging. It may be an adjunct to an existing lime, cement, expanded shale, or clay products plant. Whatever the circumstances, the basic elements of processing are modified by the particular type of pozzolan manufactured.

Volcanic Glass Processing Pumicite, scoria, tuffs, and volcanic ashes and cinders must be prepared first of all for drying prior to efficient grinding. There is somewhat less likelihood for calcining prior to grinding. Many of the Western regions in which these volcanics are found have a fairly dry climate, and the drying operation would only be involved during a part of the year. However, fine grinding is critically sensitive to agglomeration due to small percentages of moisture; and with some materials a small amount of moisture can seriously restrict mill output below an economical level, and can also affect particle size and distribution.

Preparation for drying depends on the type of drying system, *i.e.*, whether it is a rotary dryer, fluidized bed dryer, or drying means applied to the classifying system, such as the introduction of hot air to the mechanical air-separator with low moisture materials. Since the grinding mills require feed of about minus ¼-in. size with the harder glasses, drying is best done with mill-feed size material after crushing. With some of the softer unconsolidated volcanics in this group, special provisions for drying the dust or fines portion must be designed into the plant.

As pointed out earlier in this discussion, the particle size range in the sub-micron sizes has a marked influence on the properties of the resulting pozzolan. It is therefore vital to design for accurate feeding control, mill loading, and efficient classifying in order to maintain any established optimum sizing and surface factor.

Thus grinding is the major cost and control item with the glassy materials; and, depending on the material and the desired surface factor, anywhere from 40 to 75 kw./ton of power may be needed.

Diatomite Processing Opaline cherts and shales are processed and behave quite differently from the diatomite opals. The shales and cherts may be best included under the Group III clays and shales in view of their similarity to the latter insofar as processing behavior and techniques are concerned.

Diatomite is soft and easily crushed. Drying may be done by any of the above mentioned methods, but requires considerably more fuel due to the usually higher moisture contents. If calcining is warranted because of the added pozzolanic activity induced thereby, drying becomes just a preheating stage of activating.

Due to the internal porosity of diatom skeletons and clusters, this material will absorb very considerable quantities of pore water. Davis and Klein determined in the course of their researches that fine grinding of the diatomite will densify the material by three to four times its bulk volume, thus lowering mixing water and producing much less drying shrinkage in the concrete, in which it is made to replace up to 10 percent by weight of the cement. If this is done in conjunction with addition of certain air-entraining agents blended into the pozzolan, the resulting diatomite becomes a very effective all-round pozzolanic material.

Fine grinding by roller or ball mills is primarily for the purpose of destroying the diatom structure. Prior calcining would make grinding easier and more effective. (Specific surface values measured by air permeability must probably be considered low, in view of the "internal" remaining pores in diatoms whose surfaces may be accessible to solution and wetting, but which do not constitute flow channels that would influence gas flow friction.) Crushed and screened earth may be dried or calcined in rotary equipment, flash-heating systems (less efficient thermally), or by fluidization. The writer's tests have shown this material to be ideal for the latter method for either drying-classifying, or for calcining. Mills can be fed fairly large particles of feed for fine grinding due to the soft brittleness of the dried or calcined material. Power costs are lower than for Group I. Conveying can be done chiefly with air. Considerable care must be exercised in the design of feeders. Volumetric feeders require constant material head and anti-flushing provisions, and all equipment to handle the powder in the plant must be volumetrically large per ton of throughput.

Clay-Shale Processing The would-be manufacturer of activated clay-shale pozzolanic materials under Group III will require the combined practical and technical background of the ceramic engineer and heavy clay products operator in winning, selecting, handling, drying, and conditioning the raw material, as well as that of the cement plant chemist and operator in calcining, grinding, classifying, and controlling the processing of these materials.

Heat activation forms a major step in the processing cycle of these pozzolanic raw materials, and the opaline cherts and shales. Once research has established the optimum time-temperature profiles for certain pozzolan design and specifications, the commercial calcining system can be designed to accomplish the process under accurate control and with economical performance.

One of the associated design problems is that of providing sufficient material residence time at a predetermined peak temperature level in order to complete the reactions and mineral lattice changes without going beyond the optimum point. In rotary kiln systems this requires provisions for low-temperature firing without smoking or overheating due to flame production. This may call for a considerably different technique of heat transfer and heat generation than the ordinary high-level heat production in kilns. With some of these Group III materials it has been learned in pilot tests that convection rather than radiation heat is required, and that the atmosphere surrounding the material is critical. Rotary calciners designed for this low-temperature operation do not require high-duty refractories, and they should in addition be well insulated. For those materials requiring only 1200 deg. to 1400 deg. F. top temperatures, external furnaces can best supply controlled heat with all fuels except gas, and such rotary systems can be readily outfitted with efficient heat exchange elements.

Depending on the initial moisture content and on the percentage of chemically combined water (high for kaolin group minerals), the fuel requirements are considerably lower than other types of rotary kiln processes, and will vary between 2,500,000 and 3,500,000 B.t.u.'s per ton of calcine. When fairly hard shale or chert is available in screened narrow size range, as it might be in a clay products or a shale expansion plant, where the material is otherwise pulverized or graded for rotary kiln feed, material size between 4-in. and 2-in. diameter could readily be activated in continuous automatic shaft kilns at higher thermal efficiency and lower cost than in rotary equipment. Tests have also shown that this would be the case for sand-size fractions calcined in fluidized bed kilns, where activating temperature control is particularly accurate and constant. With existing kilns of the rotary type available on a full- or part-time basis, only certain minor alterations and dual heat generating means would be necessary to produce active pozzolans,

although specifically designed kiln systems for the required process would operate at lower overall cost and much closer control.

In studying the required activating temperatures obtained in laboratory research, the reader should keep in mind that these temperatures may be substantially increased for shorter periods of time in commercial calcining equipment. Considerable large-scale testing data is yet required to predict to what degree temperature may be substituted for exposure time in commercial practice. Associated minerals, volatiles and fluxes in the pozzolan raw material, as well as size range and burner-kiln design, will determine the allowable variation from the laboratory conditions found most satisfactory. The greater the mixture of clay minerals in any one shale or clay, the less pronounced will be the changes in pozzolanic activity with slight time-temperature variations. Opal and kaolin are probably most sensitive by themselves in this respect.

The structural clay products manufacturer and the expanded shale producer could be rather favorably situated in some regions and under certain conditions for developing pozzolans as an adjunct process. In the case of the latter, there is the additional opportunity to use this material in any associated concrete products manufacturing operation for economic reasons alone, provided, of course, that a suitable pozzolan can be processed economically.

In regard to grinding and classifying the activated material in this Group III, what has been said previously in respect to the other materials also holds here. Power costs should be lower than for Group I glasses, while raw-material handling and conditioning would be costlier with the moist plastic clay types.

GENERAL CONCLUSIONS

If a pozzolan-producing industry is to be established on a sound and economically justified basis, its products, standards of control, standards of quality, use development and research must be guided by responsible producers who realize that they have a primary material and purpose designed to improve concrete products. There is also the opportunity to enhance the value of present day portland cements, help meet certain aggregate and cement deficiencies in some areas or for some applications, make it more possible for cement producers to supply fewer special types of cements, and provide the concrete building industry with a cost-saving and concrete-improving means that can only further the increased use and confidence in cementitious building products and structures.

It is hoped that this discussion may awaken further interest in the potential for a wider use and application of pozzolanic materials throughout the concrete industry, and especially in those would-be producers who may have natural pozzolanic material available for processing, and in whose area the cement producers cannot supply such material themselves. It was also the purpose here to indicate the need for much basic and processing research, the variable problems of pozzolan production, marketing and distribution, and the necessity at the outset for a broadminded long-range co-operative attitude and good will among all the cement and concrete producers and users in developing the field of application.

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Pumice, Incorporated

(*From page* 76.)

drying temperature is held to 1,000 deg. F. or less to prevent calcination of the pumice.

The finer pumice is classified by air separation, and all elevators and processing units are enclosed and under vacuum to recover the desired fines. This likewise keeps the plant and the surrounding area remarkably free of nuisance dust.

Grinding of the pozzolan is done by a Hardinge 8-ft. conical air-swept ball-mill, which operates in closed circuit with one of the plant's loop-type air classifiers. The latter supplies a dried minus 20-mesh feed to the mill. Final product classification is effected by an air jet to a 10-ft. cyclone, followed by a Gayco mechanical air separator.

All products of the plant—and they are many and varied as to ultimate use—are marketed under the trade-name "Volcolite". A considerable portion is bagged for the convenience of the user. Some of the uses include employment as an inert ingredient in insecticides, as a soil aerator and conditioner, as loose insulating fill (its "K" factor of 0.28 compares favorably with rock wool at 0.27), and as traction granules for slippery pavements. The material is also used as a constituent of packaged prepared lightweight dry mix for use as plaster, mortar, stucco, and concrete, which is ready for use simply by adding water and mixing.

The concern was incorporated under its present name, Pumice, Incorporated, in 1951. Main offices are located in Idaho Falls, where Mr. Milner has his headquarters. Assisting him is James W. Enke, who recently joined the organization after 17 years of service with Westinghouse in an administrative capacity. H. A. Harmon is production manager, and Clifford E. Emerick is chief engineer.

Nation's Longest Conveyor Planned for Potash Plant

The longest conveyor system in the United States is to be installed in the Carlsbad, N. M., potash mine of the Potash Company of America. The designer, builder and installer of the system is Hewitt-Robins, Inc.

The record-length "rubber railroad" will operate 1,000 ft. underground in a potash ore seam about 4 ft. thick. The present system, 5,800 ft. long, plus the 32,320 ft. additional, will give a total of 38,120 ft., or approximately 7¼ miles.

Continuous mining machines will extract the ore from the working face of the seam and deposit it on shuttle-type conveyors which will automatically transfer it by intermediate belts to the main line. From this point the potash will be carried more than 5 miles to a 3,000-ton underground storage pocket, to be withdrawn as needed by a special rotary plow feeder and delivered to a vertical skip hoist by additional belt conveyors.

WASHINGTON NEWS LETTER

IN Washington politics never takes a holiday. Now that the mid-term Congressional elections are over, all eyes turn immediately to the next Presidential contest.

Among the most difficult things which President Eisenhower and the Republican Party will have to explain away is why they were not able to balance the budget. That they made Herculean efforts to achieve this goal cannot be denied; but every time success seemed to be within reach, it evaded them.

In January, when the President sent his budget message to Congress, he predicted that his administration would be able, despite tax cuts, to reduce the 1955 government deficit slightly below that of 1954 and substantially below the 1953 deficit. By September the Bureau of the Budget reported that there was no real possibility of accomplishing this. It was estimated that the 1955 deficit would be almost $2,000,000,000 higher than in 1954—a development which is sure to be regarded as a backward step.

The 1955 deficit, which is expected to amount to $4,700,000,000 dollars, will be greater than the deficit in any previous year except when the nation was actually engaged in a fighting war—such as 1953 and 1942 through 1946. It will be particularly galling that the only years during the last 25 in which budget surpluses were achieved were 1947, 1948, and 1951, during the Truman Administration.

This fact can be expected to be heard with increasing frequency in the near future. It is likely to become one of the pillars of the Truman build-up which the Democratic strategists appear to be planning. Not that the former President is likely to be a candidate for office, but he remains the greatest national vote getter they have.

Now that time has dulled some of his and his administration's roughest spots, the Truman legend is beginning to form. Speech after speech of Adlai Stevenson and other Democratic spokesmen are reciting the record of his anti-Communism. His quality for identification with the "average" voter has long been demonstrated. Add this to some recent victories for outspoken liberals, and the reason for the optimism of the Democrats is clear. And they would be particularly happy to point out that the Republican "business dominated" administration was not even able to balance the budget.

There are plenty of good reasons why the dilemma in which the Republicans find themselves is not their fault; but who is going to listen to sophisticated arguments dealing with fiscal policy?

In January President Eisenhower expected that his administration would be able to reduce 1955 federal expenditures by $2,000,000,000 below 1954 expenditures. By September the Budget Bureau reported that they were able to do much better than that. Based on available appropriations, 1955 expenditures would be almost $4,000,000,000 below those of 1954. However, it was the Budget Bureau's unpleasant task to report that receipts, which were expected to fall by less than $2,000,000,000, are actually expected to decline by over $5,000,000,000. Hence, an increase in the expected deficit.

Many people are asking, "What happened?" On the outgo side, the answer is relatively simple. The "new look" national security program is expected to save a lot of money. The principal decline is in procurement, with some decline in personnel. Other elements of outgo have changed very little—some up, some down.

From the political point of view, the reduction in national security expenditures is not an unmixed blessing. It has given rise to the serious charge that the desire to make a record on budget balancing may be imperilling our national safety. A more specific problem to the budget balancers is that a reduction in military expenditures may boomerang by reducing individual and corporate incomes and thereby further reduce government tax receipts.

On the income side the Eisenhower Administration can point to the fact that they opposed the reduction in excise taxes which cost the Federal Government $1,000,000,000. This explanation, however, lost some of its "ring" when in June the President took credit for "tax cuts totaling $7,500,000,000." Of greater significance is the fact that the drop in business cost the Federal Government over $2,000,000,000 in taxes.

It is at this point in the reasoning that the animal begins to chase its tail. The question is being asked, "Would the deficit have been any greater if expenditures had not been reduced and, as a result, business would not have fallen off, thereby reducing tax receipts?" This question has a New Dealish sound, but it is also being talked about in other quarters.

If less unemployment had resulted from the contrary policy, the going in such heavily industrialized states as Ohio, Michigan, and even New Jersey would not have been so difficult.

An individual's budget can be balanced by the direct expedient of reducing expenditures. Many businessmen know, however, that reducing expenditures may not result in balancing the budget of a business. For example, the elimination of salesmen would reduce expenditures, but it would probably also reduce the volume of business so greatly that the deficit would be greater after the expenditure was cut than before.

Many businessmen in Washington are beginning to wonder whether the nation's budget operates more like a business budget than that of an individual.

Marquette's Brandon Plant Honored for Safe Operation

A ceremony in recognition of an outstanding safety record was held on October 7 at the Marquette Cement Manufacturing Company's Brandon, Miss., plant. There has never been a lost-time accident at the plant since operations were begun there nearly three years ago.

In tribute to this achievement, and specifically for attainment of membership in the exclusive 1,000-Day (safety) Club of the Portland Cement Association, a special flag was presented and a commemorative addition was made to the safety trophy monument first won by the employees two years ago.

Sam Webb, plant superintendent, extended the official welcome. Speakers included Frank Moyle, Marquette vice-president, D. S. Colburn, executive vice-president, and Governor Hugh L. White of Mississippi.

The safety awards were made by Ivan F. LeGore, safety director of the Portland Cement Association.

N.L.A. Operating Meeting Held in Milwaukee

Innovation of meeting is tour of lime equipment makers' plants

another ON THE SPOT report

By KENNETH A. GUTSCHICK

LIME producers were exposed to a long but pleasant workout at the tenth operating meeting of the National Lime Association last month at the Hotel Pfister in Milwaukee, Wis. Officially, the meeting was a three-day affair held on September 20 to 22; total attendance numbered 113, the third-highest in the association's history. However, an innovation followed the regular meeting in the form of a two-day lime plant tour, which included visits to both the Rockwell Lime Company, Manitowoc, Wis., and the Dow Chemical Company, Ludington, Mich.; many of the group stayed over to take part in this post-meeting plant tour. Travel across Lake Michigan to the Dow plant was *via* overnight boat.

Because Milwaukee was chosen as the meeting site, the lime men were able to add another first—namely touring lime and quarry equipment manufacturing plants, which are largely concentrated in that city. Visits were made to both the Nordberg and the Allis-Chalmers manufacturing companies; and then during the post-meeting tour the group also visited the Manitowoc Engineering Corporation at Manitowoc.

Many new ideas on lime processing techniques and equipment were presented at the meeting. Papers were given on rotary and vertical kilns and also on a new type of hydrator and grinding mill developed by Kennedy-Van Saun. Castable refractories, modern gear practices, and hydraulic couplings were discussed at the lime plant equipment session. Finally, to add balance to the program, there was a session devoted to personnel relations.

Social activities were not overlooked. In addition to the annual banquet, the lime producers were treated to a very fine smorgasbord dinner and tour at the Pabst Brewery, and one afternoon was set aside for the Milwaukee-Cincinnati baseball game. However, some producers took advantage of this "free" afternoon to visit more Milwaukee equipment manufacturing plants.

Instrumental in making the tenth operating meeting a success were Michael Brisch (Rockwell Lime Company), the meeting chairman, and Clarence Stielstra (Dow Chemical Company), the program chairman.

A quartet of members attending the N.L.A. operating meeting included (left to right): John Gaisford, Lee Lime Corp., and three New England Lime Co. men, W. J. Ash, James B. Wood, and Louis Bongionlatti Jr.

Manufacturers' Tours The trip to the equipment manufacturers' plants enabled the producers to observe the intricate details in the fabricating and assembling of many kinds of machinery and equipment used in the lime industry. The main item of interest at the Nordberg Manufacturing Company was the crushing and screening department, which

W. G. Smith and R. S. Adams, both of the Gypsum, Lime, & Alabastine, Canada Ltd.; Mr. Adams discussed vertical kiln operations.

John L. Carlisle, Texas Lime Co., and Clarence Stielstra, Dow Chemical Co.; the latter was chairman of the program committee.

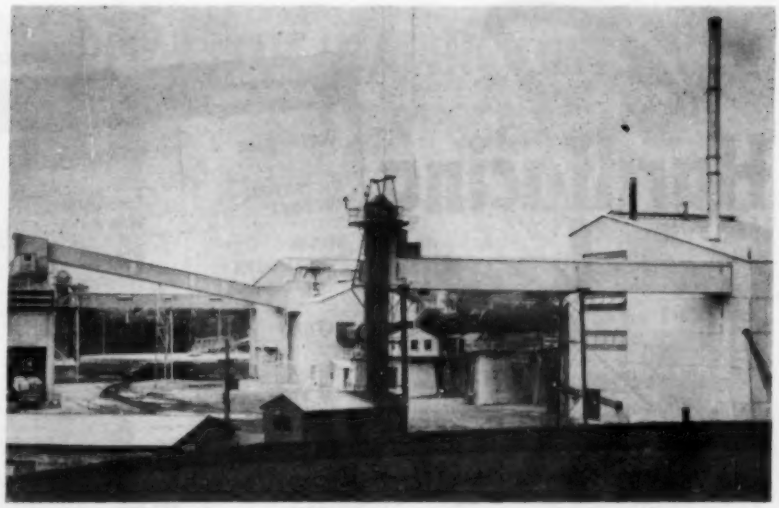
Ray A. Witschey, A. P. Green Fire Brick Co., and W. P. Schmitter, The Falk Corp.; both spoke at the Wednesday morning session.

turns out the Symons cone crushers, the new-type Gyradisc crusher for fine reduction, Symons V-screens and horizontal vibrating screens, grinding mills, rotary kilns, and coolers, etc. Interesting foundry and machine shop operations were also observed.

The Allis-Chalmers tour offered two highlights — the manufacturing plant itself, which sprawls out over 160 acres, and the Basic Industries Laboratory. The plant tour included visits to the foundry, where huge castings were being poured, to the pattern shop, the tractor assembly plant, and various machine shops. Of special interest was the 1,250-ft. main erection floor in the assembly area, where power units, motors, crushers, etc., were being erected and tested. Here the lime men observed the 6109 gyratory crusher under erection; this will be the world's largest gyratory crusher.

The tour of the research laboratory gave the producers the opportunity to view one of the finest, most modern engineering and scientific research laboratories in the country, where both basic and applied research is carried on. Research is undertaken not only on the development of new industrial processes or improvement of existing processes but also on the mechanical development and application of process machinery. A highlight of this phase of the tour was the processing section, where pilot operations in crushing, grinding, screening, hydro-processing, washing, burning (rotary kiln), cooling, drying, beneficiation, etc., are carried on. The metallurgical laboratories, complete with spectrographs, X-ray diffraction apparatus, electron microscopes, etc., were inspected.

At the Manitowoc Engineering Corp. plant in Manitowoc, the group toured the crane and shovel department and viewed the construction of a bulk limestone carrier.



A general view of the rotary kiln lime plant of the Dow Chemical Company at Ludington, Mich.

Lime Plant Tours Two principal features were observed at the Rockwell lime operation, including the use of liquid propane gas in the firing of the firm's rotary kiln* and the new hydrating equipment undergoing installation. The latter consists of the new Kennedy-Van Saun non-pressure hydrator for dolomitic lime, as well as the Plasticitor, a special kind of grinding mill for hydrated lime which utilizes small rod-like metal charges. This mill is the first of its kind to be installed. Both units are described in more detail in Maurice Shafer's paper, which follows.

*This phase was described in PIT AND QUARRY, May, 1953, pp. 110-113, C. R. Atherton—*Rockwell Lime Company Places New Rotary Kiln in Operation.*

The Dow plant at Ludington, utilizing raw limestone brought in by lake freighters from Upper Michigan, features two high-capacity rotary kilns and direct contact coolers. About 28 members of N.L.A. were taken through all departments of this plant, from the limestone and coal dock to the shops and warehouses.

Next Meeting It was announced that in 1955 the association will combine its annual meeting with the operating meeting; the joint affair will be held at Del Monte Lodge, Pebble Beach, Calif., on October 19 to 21. This will be first meeting held west of the Mississippi River. D. M. Kerr, Kaiser Aluminum & Chemical Corporation, will serve as program chairman. It is expected that Kaiser's Natividad plant will be visited by the group during the meeting. Kennedy Ellsworth, United States Lime Products Corporation, will be general chairman.

Left to right: R. A. Harmon, Twin Disc Clutch Co., who spoke on hydraulic couplings; Fred D. Witmer Jr., Ohio Lime Co.; J. E. Jackson, Marblehead Lime Co.; and J. G. Wilson and E. L. Shoemaker, both of the Warner Co.

Lime Processing The first session, on lime processing, was presided over by Clarence La Liberte, Cutler Magner Company, Duluth, Minn. Robert S. Adams, plant manager, thus described the progress made in the production of lime in vertical kilns by Gypsum, Lime and Alabastine, Canada, Ltd., at Beachville, Ont.

"On the four original kilns of 57-sq. ft. shaft area we have about reached our goal of 100 tons per kiln per day; we average 90 to 95 tons per day," he stated. "We are still experimenting with the fifth kiln, which now averages 180 tons per day. Much experimental work has gone into the raising of this capacity,

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which in 1939 was 55 tons per kiln per day. . . ."

In 1939 it was decided rather than revamp the firm's 10 hand-fired kilns, which produced approximately 10 tons of lime per kiln per day, to build a new plant entirely with two new vertical shaft kilns having internal gas flues. The new kilns were designed to burn natural gas evenly distributed through gas ports equally spaced on each side of the internal flues and through ports in the side walls of the kiln. Each cooler was divided into four sections by a cross-wall at right angles to the internal flue. A storage zone of sufficient capacity was superimposed on top of this duct, good for 8 hours of production at 55 tons.

In 1940 the natural gas supply was cut off and a Wood 10-ft. automatic gas producer was installed, with the necessary large gas ducts, soot collector, and a redesigned internal flue. A third kiln of the same design was also installed. In 1945 another kiln was built and a 10-ft. Wellman automatic producer was installed to take care of the increased tonnage. Production also had increased in these four original kilns to approximately 70 to 75 tons per kiln per day.

A new stone screening plant was then designed and built with sufficient storage silos to run the four original kilns and the small stone kiln, which was built at this time, for 24 or 36 hours. As a further aid to quality and for more lime storage, three 150-ton cooling bins were provided for the cooling of lime from the original four kilns.

The new stone screening plant can supply several sizes of stone but only 4- to 6-in. is now burned. Fines are also screened out to get better draft, less channeling, and less core. About 4 lb. of air is used per lb. of coal, CO_2 is held at about 2.5 percent, and produces temperature at a maximum of 1,500 deg. F. Mr. Adams described the injector method used to attain a turbulent gas-air mixture distributed to all parts of the burning area. Injected air was held at 600 deg. and the air from the cooler at as high a temperature as possible. As a result the combustion temperature and production were greatly increased. The kilns are now drawn every 25 minutes.

Basic refractories are used exclusively. The cooler in the small-stone kiln is divided into six sections by a cross wall at right angles to the flues, and drawing is done by six Syntron vibrators. The two flues in the kiln were originally equally spaced, but this was adjusted to differences in the interior construction, resulting in better and cooler lime. Both gas and air are controlled by splitting the gas flues and air duct into sections so that any section can be controlled by dampers.

Joseph G. Brisch and Michael Brisch, Rockwell Lime Co.; their plant at Manitowoc was one of the two visited on the post-meeting tour.

Following the paper on vertical kilns, Victor J. Azbe, Azbe Corporation, St. Louis, presented a comprehensive paper on rotary kilns, dealing with their performance, evaluation, and development. He pointed out at the outset that even the best rotary lime kilns are only 40 percent efficient (that is, 60 percent of the heat generated is wasted). Three major heat losses which are often overlooked, he said, are (1) loss due to radiation and convection of heat from the kiln structure, (2) loss due to the calcining zone terminal temperature differential, and (3) loss due to non-recuperative cooling. After elaborating on the various rotary kiln deficiencies and their reasons, Mr. Azbe presented a number of innovations which he claimed would bring the thermal efficiency up to about 60 percent: thus 4.5 million B.t.u.'s would be required per ton of lime instead of the 6½ to 13 million B.t.u.'s presently utilized in the industry.

In the Azbe system the increased efficiency is accomplished by means of increasing the kiln capacity and by various improvements such as preheaters, recuperative coolers, dams, quadrants, etc. He maintained that the improvements must be made throughout the entire system—not just partially.

Main features of this system, as claimed by Mr. Azbe, are as follows:

1. The rotary kiln is short and compact and of high capacity on the order of 20 to not more than 25 cu. ft. of internal volume per ton of output. For 240 tons a kiln would be about 8 by 120 ft.—for 75 tons, 5 by 80 ft.

2. High thermal efficiency, about 60 percent, requires no more than 4.5 million B.t.u.'s per ton of high-calcium lime.

3. The kiln waste gas temperature is low, within 50 deg. F. of the theoretical temperature corresponding to the thermal efficiency. This is made possible by arrangements which reduce the calcining zone terminal temperature differential.

4. The arrangement which accomplishes terminal cooling tends also to some extent to filter the gases, reducing the loss to the dust chamber and the stack and returnng it to the kiln.

5. The kiln is equipped with a stationary sectionalized and pressurized chamber of dual purpose, where the conventional lime cooler usually is located. The upper part of this is the finishing zone or secondary calciner. The lower portion is the "Recuperative Lime Cooler", through which a sufficiently large amount of air passes under pressure to cool the lime completely.

6. The kiln is of a relatively low temperature peak (less than 2,500 deg. F). In view of this fact, refractory, scale adhesion, and ring problems are unlikely to occur.

7. A kiln of such low temperature will allow complete insulation without inducing the usual fear of refractory failure; radiation loss is therefore reduced to the rather low figure of 5 percent.

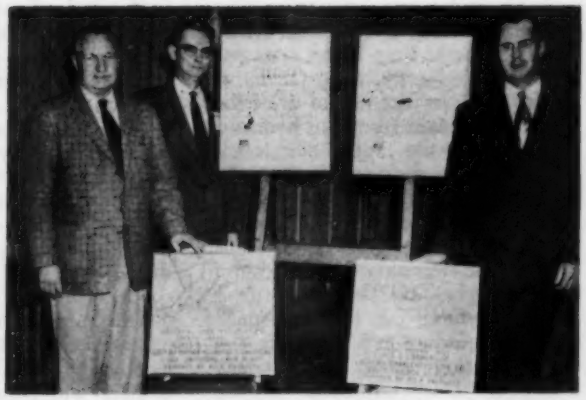
8. The kiln is not critical in its stone size acceptance, permitting a wide range in the feed, perhaps the entire unscreened crusher discharge, without reducing capacity or causing poor quality.

9. The "Static Stone Preheater" ahead of the kiln, wherein stone is retained for a short time in intimate contact with the escaping gases, flows at a high rate of speed required for a high rate of heat transfer.

10. The adjustable "Feed Pipe", by its respective vertical position, determines the stone load in the kiln.

11. The kiln in its initial length is open, followed by a "progressive section" consisting of metallic "spirals" of special deep design which tend to advance the stone, as well as to give the gases a rather energetic rotary action. Then comes the quadrated section, consisting of laminated refractory blocks, extending from the preheating through the calcining zone. This not only divides the stone but also the gas stream into several separate streams, thus greatly increasing the heating efficiency and burning of even the fines. Beyond the edge of the quadrant section, for a short distance, the kiln is open. At the out-

Arnold Lange, Hohenlimburger Kalkwerke; Yolande Rauert, Azbe Corp.; and Hermann Holland, F. Schwenk Nach F. Herrlingen; the two young men are German students touring this country's lime plants.



Posing before their company's safety awards are (left to right) D. M. Kerr, Kaiser Aluminum & Chemical Corp., winner in Class A-1 competition; K. V. Smith, Ash Grove Lime & Portland Cement Co., one of the two plants winning the association's 1000 Day award; and C. P. Jorgensen, Marblehead Lime Co., winner in Class C competition.

let of the kiln there is a dam, whose purpose is to retain the load of lime within the open section of the kiln that was established by the adjustable feed pipe and the spirals combined at the opposite end.

12. The lime may discharge over the dam directly into the "Secondary Calcining Section" of the "Recuperative Unit", or it may pass through an activated grate, from which the occasional spalled-off material is removed.

The speaker also cited other advantages dealing with combustion and gas flow, insulation of the kiln and recuperative cooler, temperature gradient control, draft control, and segmentation.

In his paper entitled *Kennedy Non-Pressure Hydrator for Calcitic and Dolomitic Lime,* Maurice Shafer, Kennedy-Van Saun Mfg. & Eng. Corporation, New York, discussed both his company's new hydrator and Plasticitor. The hydrator was developed last year as a means of obtaining complete hydration of magnesia in dolomitic limes without the use of a pressure vessel; the unit also improves the plasticity of the lime, making it meet Type "S" specifications.

Mr. Shafer explained that the principle of design of the new hydrator is based on the three basic steps involved in the hydration process—namely (1) mixing the quicklime and water, (2) aging the material in the presence of steam so that the chemical reaction may be completed, and (3) drying and cooling the hydrate. Early hydrators, he said, embody the three steps, but most of them attempt to perform the functions in a single piece of equipment. The Kennedy hydrator, on the other hand, has three separate parts, including the mixer, the seasoner, and the cooler. Each of these parts is designed to perform only a single task.

The mixer portion consists of a small, high-speed unit designed to give a complete and intimate mix within 5 seconds. The quicklime is charged by a Poidometer belt, thus providing a constant weight of lime. Water for hydration is metered by a Rotometer for accurate control and is then sprayed into the mixer through a pipe which may be positioned longitudinally in accordance with the activity of the lime.

In order to have the mix completed and hydration just started as the mixture of quicklime and water leaves the mixer, the point of addition of the water can be varied according to the speed of the quicklime. Thus, if the quicklime is very active, the addition point is retracted toward the discharge end of the mixer.

The mixer then discharges through a straight drop into the end of the seasoner. Mr. Shafer emphasized that since the entire system is under atmospheric pressure, no complicated mechanism is needed here.

The seasoner consists of a horizontal cylinder equipped with a slowly rotating shaft carrying a multiplicity of cutting blades which break up any lumps that may form. The size of the cylinder, he said, is the principal variable in the equipment, being determined by the desired tonnage output and the required retention time.

The hydrate overflows at the discharge end of the cylinder over an adjustable baffle to the cooler, and the steam is exhausted at this same end. At the firm's first installation (Lee Lime Corporation), a cylinder 6 ft. in dia. and 20 ft. long is hydrating 6 t.p.h. of rotary kiln dolomitic quicklime to Type "S" specifications. This particular hydrator could readily handle perhaps 10 to 12 t.p.h., the speaker added.

A unique feature of the hydrator is the oil jacket on the seasoning cylinder, which serves three functions. First, by circulating preheated oil (over 200 deg. F.) through the jacket prior to starting the hydration the equipment becomes thoroughly heated, and hydration may be started with the full ratio of water to quicklime, thereby avoiding the production of off-grade hydrate during the warm-up stage.

Second, the oil jacket permits the shut-down of the equipment under load at any time and the subsequent starting without evacuation of the seasoner.

Third—and this is the major advantage, Mr. Shafer said—during operation it transfers some heat from the initial portion of the seasoner, where there may be an excessive amount of heat, to the final portion of the seasoner where the heat generation may be deficient. This is particularly important in the hydration of dolomitic lime since the magnesia present is very slow to hydrate. According to the speaker, loss of heat by radiation is completely stopped, so that the magnesia has ample time to complete its hydration without either overheating or underheating, and thus the production of a quality product is insured.

From the seasoner, the hydrate discharges to the cooler, which is in effect a ribbon conveyor. Air flows countercurrent to the hydrate and cools and dries it completely. The cooler may be as short as 10 ft., but can be extended to any length desired to meet the plant requirements.

Since the air in the cooler flows countercurrently to the hydrate, the two meet at the junction of the seasoner and the cooler. At this point,

both air and steam pass to an exhauster and then to a wet scrubber, the hot milk of lime being used for the hydration water.

The necessary exhaust or draft for removal of steam from the hydrator and air from the lime cooler is accomplished by the use of a venturi type exhauster with no moving parts. Fresh heated water in metered quantity is delivered to the venturi, thus creating the necessary draft, and also further preheating the water prior to its introduction in the high-speed mixer. According to Mr. Shafer, the new hydrating system is practically dust-free. Dust entrained in the steam from the hydrator or air from the lime cooler is returned to the process *via* the preheated water as milk of lime.

While the Kennedy hydrator comprises three separate units, it is readily handled by one operator, Mr. Shafer added. All controls are centrally located.

The speaker next discussed the new Kennedy Plasticitor, which follows the cooler in the flow sheet. This unit is a special type of rotating 5- by 18-ft. drum, using small rod-like metal media. The interior of the mill is divided into four chambers, so that the charge of plasticizing media and hydrate is divided. The rods are ¾ to ⅞ in. in dia. and 2 in. long.

Rotation of the Plasticitor, effected by a 100-hp. motor, results in a sliding or rubbing motion of the small rods over the hydrate, thus causing an agglomerating of the hydrate—not grinding or pulverizing, since there is no cascading effect, Mr. Shafer reported. He claimed that with this Plasticitor it is easily possible to attain plasticity of over 300.

In concluding, Mr. Shafer noted that while the flow-sheet for simplicity indicates a straight-line flow, the three units of the hydrator may be folded to meet almost any existing plant layout.

In the question period following the paper, Mr. Shafer reported that there is no air separator following the Plasticitor in the flow sheet; none is required, he said.

Personnel Relations At the session on personnel relations, which was presided over by Jesse J. Jacobsen, Limestone Products Company, Menominee, Mich., the first paper was given by Robert M. Rompf, Dept. of Business and Industry, Michigan State College, East Lansing, Mich., on the subject *Making Job Instruction More Effective.* In a talk punctuated by considerable humor, Mr. Rompf brought across several timely points. First, he likened any business organization to a school, where the workers are the students and the supervisors are the instructors. He emphasized that job instruction is by all means a daily task—not one that is forgotten soon after an employee starts working. Without proper training of the employees, many problems are created, such as higher costs, lower productivity, poorer quality of workmanship, waste, lack of safety, lack of cooperation, etc.

The speaker advocated that top management make more careful selection of supervisory personnel, particularly with regard to their teaching ability. Prime qualifications which are a part of teaching ability, he went on, include understanding the job, understanding how people learn, sincerity, patience, friendliness, and ability to organize a teaching program. As for the method of teaching, he referred to the generally-accepted four-step method, which involves preparing the learner, presenting the facts, having the student make application, and last the follow-up. With this method, he said, it is best to give visual pictures whenever possible.

Mr. Rompf declared that people learn best when they have interest in the subject, know the purpose of their training, and know their progress; also when their learning is accompanied by satisfaction and the subject matter is presented vividly and with sufficient repetition. In addition, and this is of utmost importance, the subject matter should be presented as an integration of related facts—not as a mass of unrelated or isolated data.

In concluding, the speaker emphasized that supervisory personnel should have more than just a technical background; this technical know-how should be supplemented by some broader training, which will enable the supervisor to know how to plan and co-ordinate his duties and to instruct his workers properly.

Industrial Safety *Industrial Safety in Wisconsin* was discussed by W. J. Kilpatrick, Supervisor of Factory Inspection, Industrial Commission, Madison. He reported that Wisconsin was the first state to set up a state industrial commission (in 1911). Since the founding, the state has paid out more than a billion dollars on accident claims. He then discussed the duties of his office, the principal one of which is to inspect the 55,000 industrial establishments in the state. When violations to state safety codes are found, the company is required to correct the faulty condition. Failure to do so is subject to fine. He added that less than 2 percent of the industrial accidents are due to violation of the codes.

The speaker stated that the new codes or revisions to old codes are constantly being made by the commission. He also discussed a few of the codes pertaining to the quarry industry. One subject of increasing importance is impairment of hearing, he said; presently state studies on the problem are in the foundation stage.

Safety Awards Two types of safety awards were presented at the meeting — trophies to the four winners in the 1953 safety contest sponsored by N.L.A. and conducted by the U. S. Bureau of Mines and certificates to two companies joining the association's 1,000 Day Club—that is, plants having operated at least 1,000 consecutive days without a lost-time accident. The following operations were winners in the national contest, who received *Rock Products* trophies for the first time: Class A-1 (quarries with calcining plants working more than 100,000 man-hours), Kaiser Aluminum & Chemical Corp., Natividad, Calif.; Class A-2 (quarries with calcining plants working less than 100,000 man-hours), J. C. Baker Co., Thomasville, Pa.; Class B (underground mines with calcining plants), Standard Lime and Stone Co., Bakerton, W. Va.; and Class C (calcining plants only), Marblehead Lime Co., South Chicago, Ill. Both the Class A-1 and Class C winners were present to receive the awards. All four plants operated without lost-time accidents in 1953.

Joining the 1,000 Day Club were the Springfield, Mo., plant of the Ash Grove Lime & Portland Cement Company and the Luckey, Ohio, plant of the National Gypsum Company. This brings to nine the number of members in this club. Both plants were given a Certificate of Achievement in Safety by N.L.A.

At the annual dinner Charles G. Arps, Public Relations Dept., Allis-Chalmers Manufacturing Company, spoke to the group on *Our Most Valuable Assets,* which to him meant our nation's working men.

Lime Plant Equipment V. Fred Nast Jr., Western Lime and Cement Co., Milwaukee, presided at the final session on lime plant equipment. The first speaker, Ray A. Witschey, A. P. Green Fire Brick Company, discussed in a thorough manner *Monolithic Refractories in the Lime Industry.* In introducing the subject, he stated

that refractories can be classified according to chemical behavior (*e.g.*, acid, basic, or neutral); mineralogical constitution (*e.g.*, fire clay, silica, mullite, magnesia, fosterite, chrome, etc.); physical form (*e.g.*, fabricated —either prefired or unfired—and monolithic); and type of construction (*e.g.*, solid masonry, suspended construcion, and monolithic). The monolithic groups, which represents the most rapidly growing phase of refractory practices, comprises four sub-groups including mortars, coatings, castables, and plastic and ramming. The last two groups are of most concern to the lime industry.

Castables, he said, are either mixed and poured like concrete or applied with a high-pressure gun like Gunite. Materials generally involved are refractory or insulating aggregates and aluminous hydraulic cement. Different types are made to meet different needs, *e.g.*, high-strength, abrasive resistant, insulating, and most recently high-early-strength.

Plastic and ramming refractories are used in an unfired plastic form, which are rammed or air-hammered in place. Subsequent firing during production burns the material.

One major advantage of monolithic refractories over brick, Mr. Witschey pointed out, is eliminating joints (which, of course, eliminates dust penetration); further, by being held in place by special supports or anchors, the wall can "breathe", thereby reducing the danger of cracking.

In the balance of the paper, the speaker discussed specific applications of monolithic refractories, illustrating the uses by means of slides. In rotary kiln plants the materials are used in the firing hoods, grate-type coolers, dust collectors, chutes, breeching chambers, stacks, ducts, conveyor flights in kiln closures, and possibly in quadrant sections. Perhaps the usage which is gaining in importance is in the firing hood, Mr. Witschey stated; this is primarily due to the fact that hoods are becoming more complex in construction detail; and monolithic refractories, being poured, are better adapted to complex areas than brick. Also the lining can easily be backed with insulation, if desired. In a hood installation, radial contraction cuts, ¾ in. deep, are made in a few places to prevent cracking. The metallic clip assemblies serving as anchors are generally alternated. In some installations, *e.g.*, coolers, a combination of monolithic refractories and brick is often used, the speaker stated. In chain sections of rotary kilns, abrasion-resistant castables have been used with success.

A lesser number of uses of monolithic refractories are found in vertical kilns, the speaker reported. Some examples are fire box section, charging zone and chutes leading into it, discharge zone, etc.

Mr. Witschey also discussed some applications in lime and cement plants other than for kilns and allied equipment. Examples included boilers, ducts, suspension preheaters, and others.

In the question-and-answer period following the paper, Mr. Witschey reported that a high-alumina castable was developed recently which may be applicable to vertical kilns. He predicted that the gum-type refractories have an excellent future.

A paper entitled *Modern Gear Practices in the Lime-Cement Industry* was given by W. P. Schmitter, The Falk Corporation, Milwaukee. Through the medium of slides Mr. Schmitter demonstrated the innumerable uses of gears in the quarrying and lime-cement industries, in many cases comparing the present gear usages to those of the past. He pointed out that gear manufacturers today must turn out properly-designed products with long life in order to meet user demands. Generally, average gear life exceeds 20 years, outlasting the equipment. Long gear life, he went on, depends largely on proper installation, proper lubrication, and prevention of contamination by abrasive materials.

The principal trend has been away from spur gears and toward single helical gears, particularly for kiln and mill drives, the reason being that helical gears have stronger teeth; this is because helical gear teeth lie obliquely, thereby effecting contact at several teeth instead of only one or two as in the case of spur gears. Because of this fact the pressure angle can be increased and the teeth can be cut deeper, thereby giving more contact and more strength.

The speaker also discussed the trend toward flexible couplings and compact self-contained speed reducers used in conjunction with higher speed motors. Herringbone gears are still of great importance, being used for many applications. Mr. Schmitter also mentioned the greater use of dual kiln drives.

The speaker showed slides on gear manufacturing and proper mill gear installation; the latter involves proper alignment of the pinion and mill gear, checking for free and radial turnout, etc. He stated that in excess of .0040 in. is allowed for backlash, for expansion and wear; the amount is greater for kiln gears. He also mentioned the importance of using jackscrews in mounting the equipment.

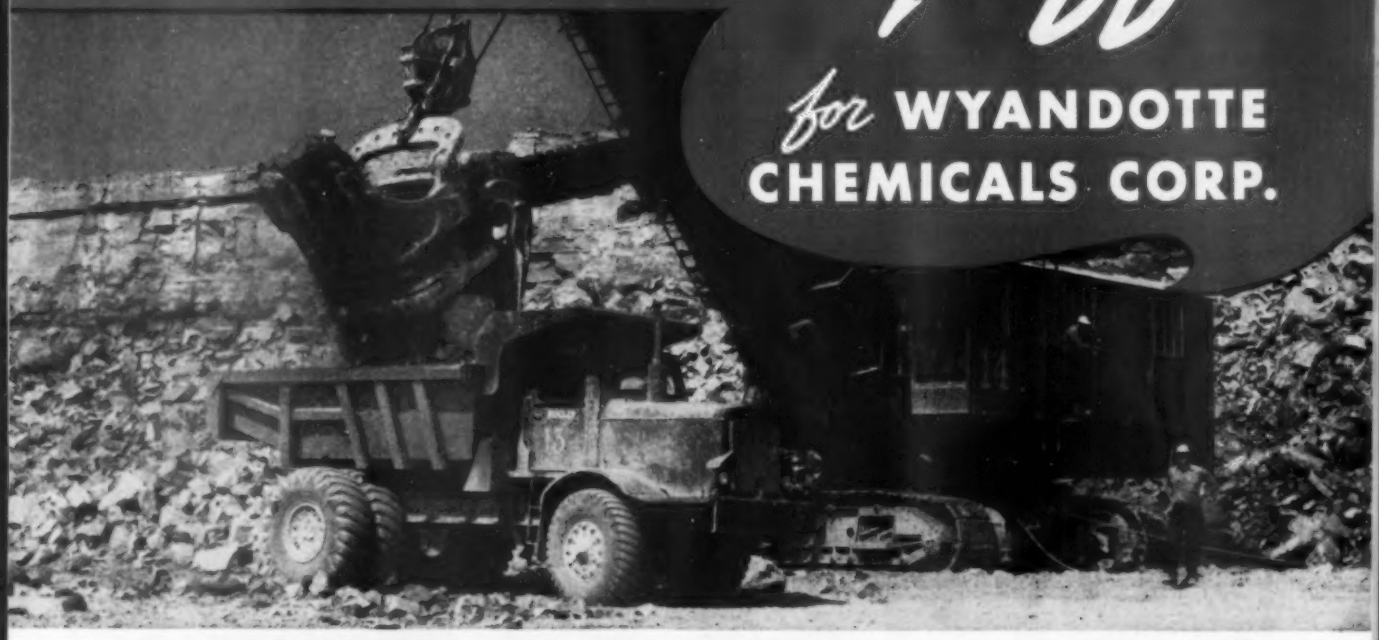
The concluding paper was given by R. A. Harmon, Twin-Disc Clutch Company, Racine, Wis., on the subject *Hydraulic Couplings — Application, Operation, and Maintenance.* Mr. Harmon discussed both fluid couplings having a 1:1 ratio and hydraulic torque converters having as high as a 6:1 ratio. In the former unit the blades which make up the couplings are straight or radial, thereby allowing the direction of the drive to be readily reversed; these are used on d.-c. and a.-c. electric motors and internal combustion engines. In the torque converter the blades are curved; consequently there can be transmission of power in only one direction; these find wide application in internal combustion engines.

Both types of drives, he stated, produce a smooth operation with quick, even acceleration. There is no stalling and consequently no burning out of motors due to heavy starting loads, shock loads, or overloads. Thus the coupling finds wide application in the quarrying and mining industry, particularly for such machinery as belt conveyors, bucket elevators, overhead cranes, crushers, screens, fans, grinding mills, etc. With a.-c. motor drives, the coupling may permit the motor to be fitted to the running load requirement rather than the starting requirements. The reversibility characteristic of the coupling is especially important in overhead cranes, he stated.

In discussing advantages of the torque converter, Mr. Harmon pointed out that besides reducing or even eliminating shifting, the unit readily adjusts itself to meet torque requirements. Widest applications, he said, are in power shovels and cranes and motor vehicles (even trucks). The advantage of reducing shifting and saving on brake usage on downhill runs is very important in heavy-duty truck operation, he added.

An unusual application of vermiculite was featured in the Double Oaks Elementary School, Charlotte, N.C., one of six new schools winning the 1953 Competition for Better School Design sponsored by *The School Executive* magazine. The use of a 35,200-sq. ft. vermiculite underbed helped to solve the problem of building the structure on an irregular site; it also provides for better temperature control.

"Eucs" Pay Off for WYANDOTTE CHEMICALS CORP.



22,000 hours...still going strong!

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Seven years ago Rear-Dump Euclids of 22-ton capacity replaced an electric haulage system for moving rock from the quarry face to the plant. Loaded with stone by shovels of 5 and 6 cu. yd. capacity, and hauling overburden during the winter months, these fourteen "Eucs" have worked an average of 22,000 hours each. On a two mile round trip haul, each "Euc" delivers approximately 75 tons per hour for a total of more than 3 million ton-miles per unit.

Wyandotte standardized on Rear-Dump Euclids because of their job proved dependability on hundreds of mine and quarry operations. Performance records prove this decision has paid off because "Euc" speed, capacity and efficiency have increased production and lowered hauling costs at Alpena.

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Basic Refractories Honored For Distinguished Advertising

Basic Refractories, Inc., Cleveland, O., has been announced as one of the 23 recipients of the second annual *Saturday Review* Awards for distinguished advertising in 1953. The award is presented ". . . to recognize annually national advertisements which best serve the public interest, and which most searchingly document the continuing miracle of America."

The citation considers the company's "Big Business" campaign an outstanding achievement in the field of institutional advertising.

"Accident Facts" (1954) Issued By National Safety Council

The 1954 edition of the National Safety Council's 96-page statistical yearbood, *Accident Facts,* just off the press, contains facts and figures on all types of accidents.

One section covers occupational accidents and provides the factual background necessary to give direction to an industrial safety program. Other features include a detailed list of accident rates by major industry groups, charts showing the accident trend during the last 25 years, the most common source of injuries, parts of the body most frequently injured, off-the-job accident problems, unsafe acts, and unsafe conditions contributing to permanent impairments and deaths.

Price, 75 cents a single copy and less for quantities. Inquiries should be sent to the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Neal J. Hardy Named Head Of National Housing Center

Neal J. Hardy, assistant administrator of the Housing and Home Finance Agency since 1949, has been appointed director of the homebuilding industry's new $2,500,000 National Housing Center in Washington, D. C.

Mr. Hardy resigned his government post, effective September 1, to take over his new assignment for the 30,000-member National Association of Home Builders, which will own and operate the National Housing Center, which is now under construction.

In his new capacity, Mr. Hardy will direct all activities of the National Housing Center, a structure designed to serve as headquarters of NAHB and as a permanent exhibit center for all the allied homebuilding industries.

Several hundred manufacturers of building materials and companies in related fields will display their products and services to the public in the Center. In addition, the structure will house NAHB's research institute and the world's most comprehensive housing reference library.

Dewey Portland Cement Co. To Use 195-Ft. Hopper Barges

Transportation of coal and other bulk products to Dewey Portland Cement Company's plants along the inland waterways will be facilitated by two new "jumbo" hopper barges now under construction at the Pittsburgh shipyard of Dravo Corporation.

The company will add the new barges to its fleet serving Dewey plants and customers along the Mississippi River system. Each of the vessels being built by Dravo is 195 ft. long, 35 ft. wide and 11 ft. deep. Capacity of each barge will be 1,350 tons.

Southern Pacific Milling Co. Reorganizes Executive Setup

Revision of the executive organization of Southern Pacific Milling Company in keeping with its expansion in the aggregates field and its withdrawal from warehouse and lumber yard operations has been announced.

Thomas M. Evans, former board chairman, is now president and treasurer. He stated that his previous position had been discontinued. Other staff members are as follows: Jake Will, vice-president in charge of operations; C. L. Holbert, vice-president in charge of finance and secretary; and F. A. Rehorst, assistant secretary.

With an initial order for 40,000 tons of paving materials, costing approximately $120,000, Redding Sand and Gravel Company, Inc., of Redding, Calif., is to set up a $390,000 sand and gravel, ready-mixed concrete, and hot-mix operation on the site of the old Columbia Construction Company's gravel pit. The original plant furnished materials used in the construction of the nearby Shasta Dam.

Net sales for the Peerless Cement Corporation for the fiscal year of 1953-54 was $11,816,999 as compared with $10,051,057 for 1952. The net profit for 1953-54 was $1,218,263, while in 1952 it was $939,841.

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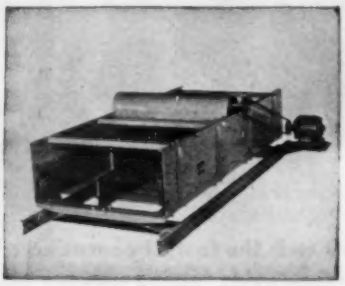
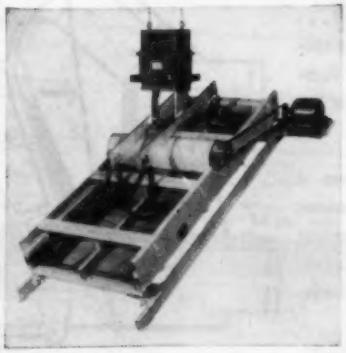


Type "MR" 42" x 96" 2-deck



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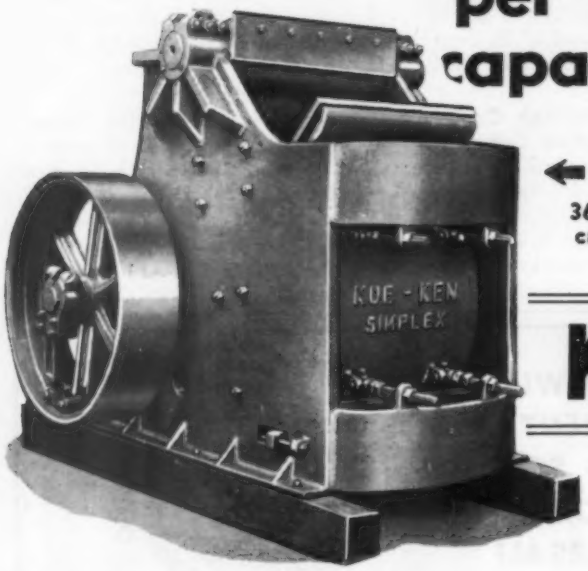
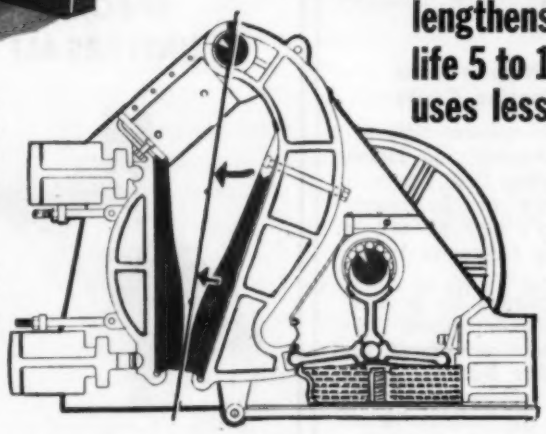
Cutaway view showing Kue-Ken hinge pin (above) and "crankcase" (below). Mechanism is protected from wear for life of crusher. Kue-Ken is the only crusher whose mechanism operates in bath of filtered, dust-free oil. Toggles do not wear out. Change oil twice a year.



36"x20" crusher

KUE-KEN Crusher

"Crushing without rubbing" lengthens jaw plate life 5 to 10 times... uses less power"



See how the Kue-Ken pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

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Kue-Ken operates at 375 RPM and gives a more cubical product and 25% to 50% more capacity. Shaft or frame breakage cannot occur with Kue-Ken. Built-in safety device releases flywheel instantly on overload. No shearing or breaking parts. Quickly reset.

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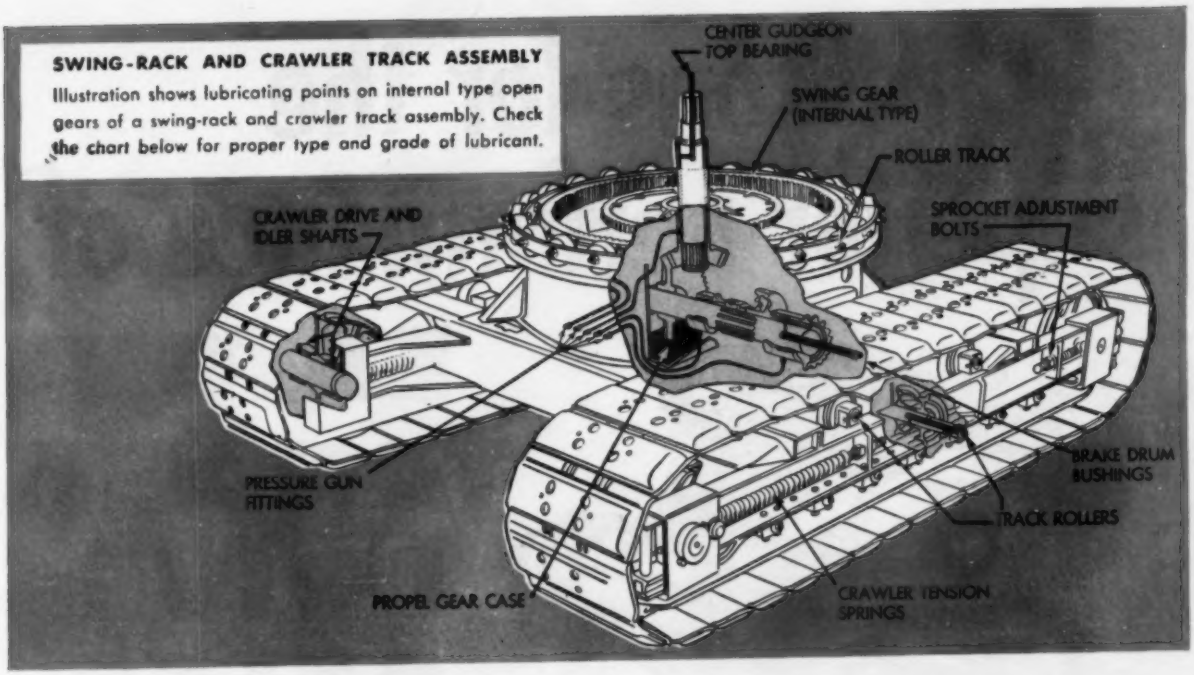
SWING-RACK AND CRAWLER TRACK ASSEMBLY
Illustration shows lubricating points on internal type open gears of a swing-rack and crawler track assembly. Check the chart below for proper type and grade of lubricant.
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SWING GEAR (INTERNAL TYPE)
ROLLER TRACK
SPROCKET ADJUSTMENT BOLTS
CRAWLER DRIVE AND IDLER SHAFTS
PRESSURE GUN FITTINGS
BRAKE DRUM BUSHINGS
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PROPEL GEAR CASE
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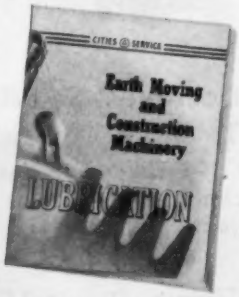
Where, how and with what to lubricate?

Lubricating procedures and suggested materials discussed on this page represent just one of the many invaluable sections contained [illegible] Cities Service EARTH MOVING AND CONSTRUCTION



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Allis-Chalmers:	Positive Seal Units	Trojan Grease	P-0	P-0
Others—				
Grease Lubricated:	Pressure gun fittings	Trojan Grease	A-0	A-1
	Pressure gun fittings	Trojan Grease	F-3-0	F-2-0
Oil Lubricated:	Hand gun or other means	Trojan Gear Oil	#90	#90 to #250
GEAR DRIVES—				
Open: Normal Condition	By brush or other means	Cisco Compound	#3-Z	#5-Z
Dusty Condition	By brush or bath	Raven Oil	#3	#7
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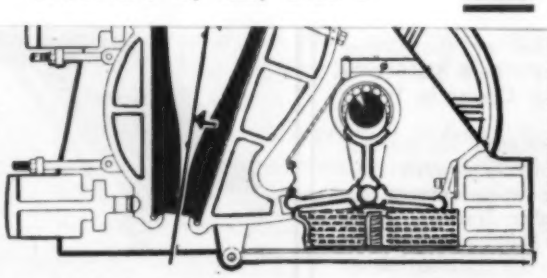

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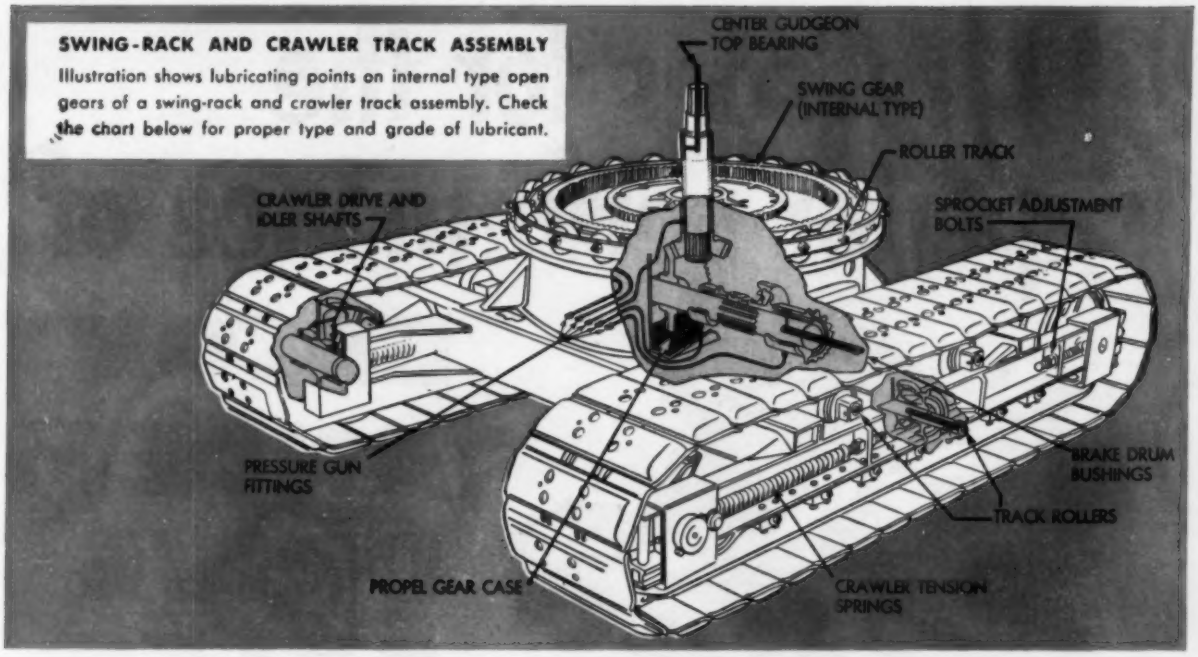
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Illustration shows lubricating points on internal type open gears of a swing-rack and crawler track assembly. Check the chart below for proper type and grade of lubricant.
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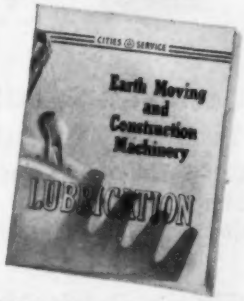

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LUBRICATION OF SWING-RACK AND CRAWLER MECHANISM

Part or Unit	How Lubricated	Lubricant Recommended	Grade No. 0°F. to 32°F.	Grade No. Above 32°F.
CRAWLER MECHANISM— Track rollers, idlers, track wheels, etc.				
Oliver:	Track Wheel System	Trojan Gear Oil	#90	#140
Allis-Chalmers:	Positive Seal Units	Trojan Grease	P-0	P-0
Others—				
Grease Lubricated:	Pressure gun fittings	Trojan Grease	A-0	A-1
	Pressure gun fittings	Trojan Grease	F-3-0	F-2-0
Oil Lubricated:	Hand gun or other means	Trojan Gear Oil	#90	#90 to #250
GEAR DRIVES—				
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Dusty Condition	By brush or bath	Raven Oil	#3	#7
Enclosed:	Bath	Trojan Gear Oil	#90	#140

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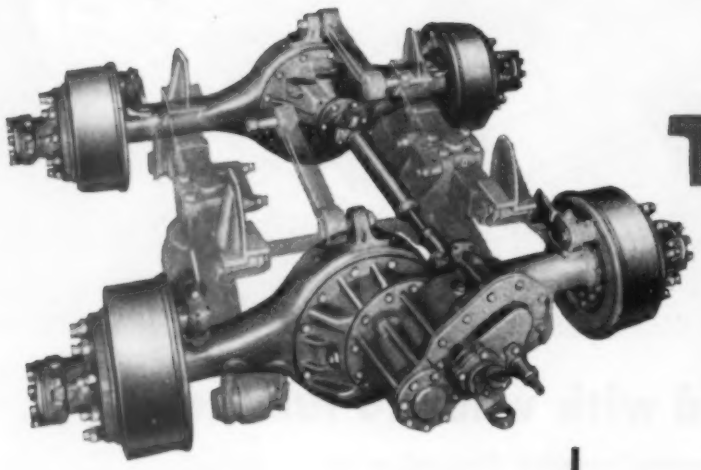

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3 Rugged Power Divider
mounted on forward axle, is of simple design; provides for transmission of power equally to both axles.

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in power divider assures equalized power transmission even though wheel speed may vary due to road irregularities or tire diameter variations.

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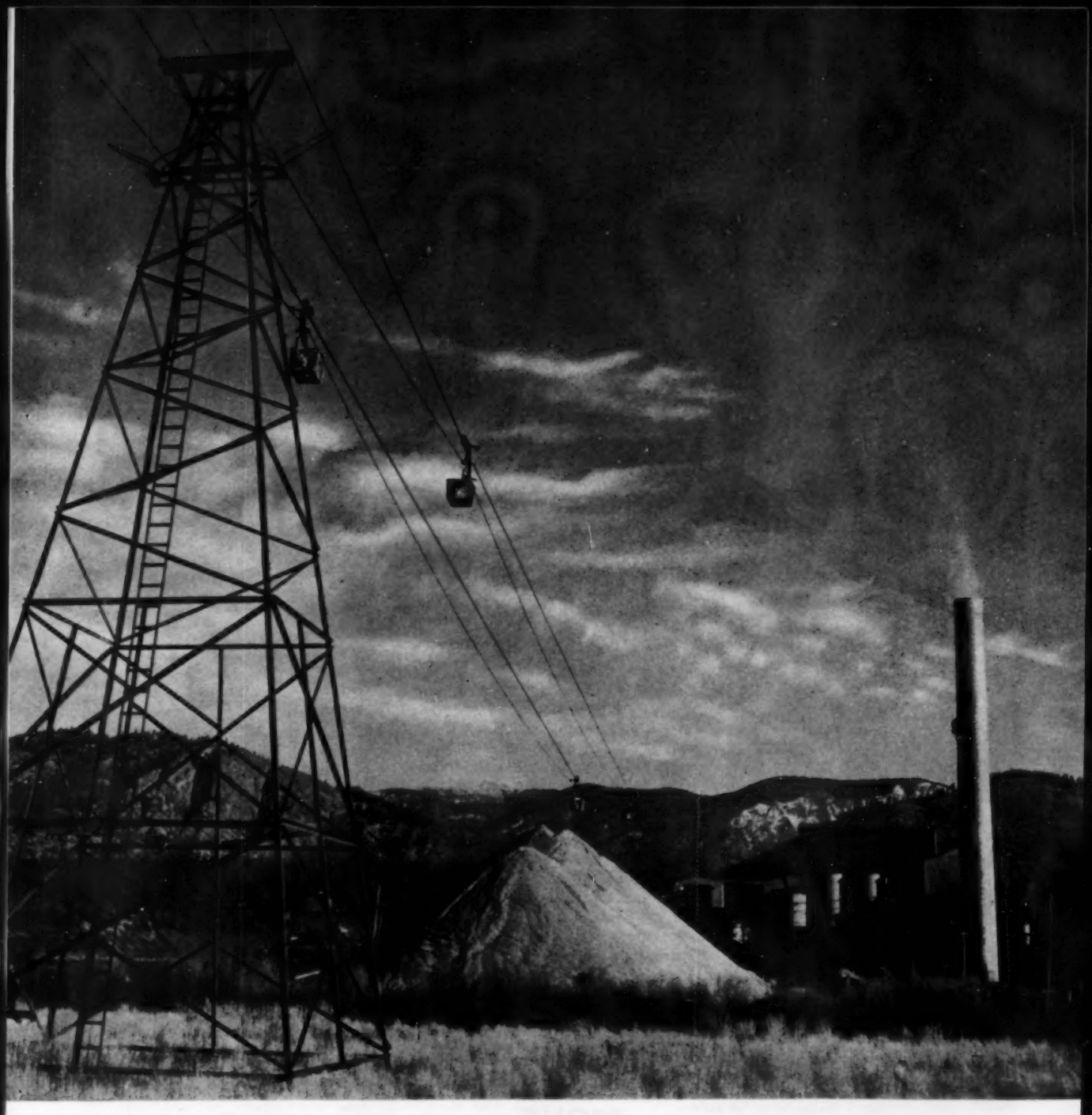

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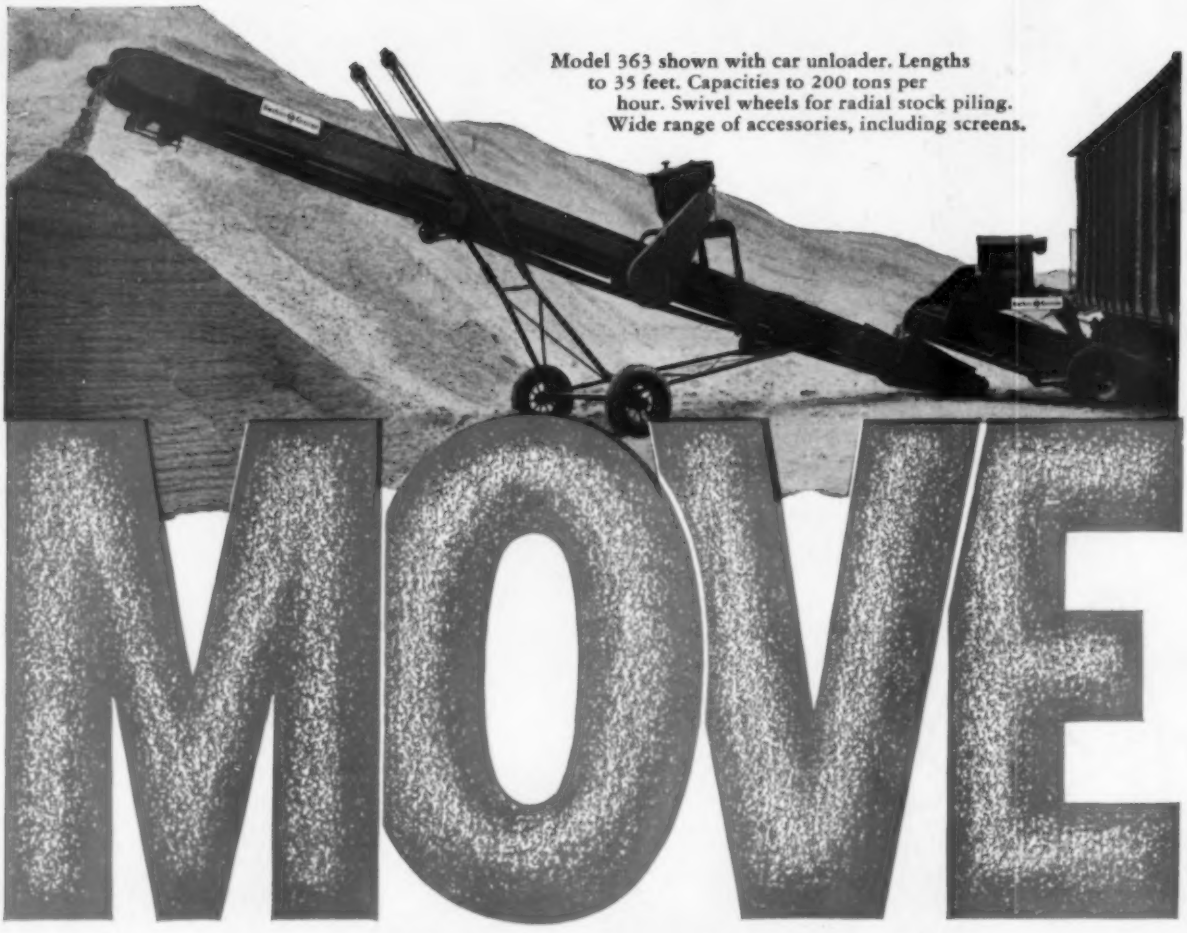

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PART II

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GEAR FAILURES

WHEN gears fail there are several factors which may be involved, such as:

(a) Excessive or shock loading
(b) High speeds
(c) Misalignment
(d) Change in metal structure
(e) Insufficient hardness of gear metals
(f) Use of wrong type of lubricant

The use of the proper lubricant for the type of operation is very important. On exposed gears under relatively clean conditions the lubricant must be adhesive as well as viscous, otherwise the film cannot resist the action of centrifugal force. There is no replenishment of lubricant by drip or spray as is possible with enclosed gears. Where an excess of dust or dirt prevails, the viscosity of the lubricant used on exposed gears should be reduced to enable some washing effect. This will prevent accumulation of dirt-contaminated lubricant at the base of the teeth, a condition which might lead to tooth breakage.

For lubrication of gears that dip into a bath it is important to choose a lubricant which at the operating temperature will be heavy enough to train with the teeth. If the oil is too light, it may not carry over to give sufficient lubrication and cooling effect to the companion gear.

The proper lubricants will, of course, minimize wear on gears operating under moderately severe conditions, but under excessively high loads, speeds, temperatures or shock conditions, even the best lubricants cannot always give full protection.

Types of Gear Failures[5]

Field experience with gears has shown that several types of failures are apt to occur. These have been grouped into the following classifications, which will assist operators in determining causes and finding solutions for failures:

Wear is a general term to cover sliding of metal against metal, or abrasion by lapping or scratching.

TYPE 1 — *Normal Wear* is the loss of metal from the surface of a gear tooth resulting from unavoidable abrasion, at such a rate, and to such a degree as does not prevent the gear from performing satisfactorily during its expected life.

TYPE 2 — *Abrasive Wear* is surface injury caused by fine or fairly fine particles carried in the lubricant or embedded in the tooth surfaces. The particles may be metal detached from the gear teeth or bearings, abrasives not completely removed before assembling, sand or scale from castings, or other impurities in the oil or surrounding atmosphere.

TYPE 3 — *Scratching* is a form of wear characterized by deep scratches in the direction of surface sliding, caused by particles that are larger in size than those associated with abrasive wear.

TYPE 4 — *Overload Wear* is a form of wear that is experienced under conditions of heavy load and low speed in both hardened and unhardened gears. Metal seems to be removed progressively in thin layers or flakes, leaving surfaces that appear somewhat as if etched.

TYPE 5 — *Ridging* is a particular form of scratching that may occur on case-hardened surfaces of hypoid pinions under heavy load, and showing closely spaced grooves and ridges in the direction of surface sliding.

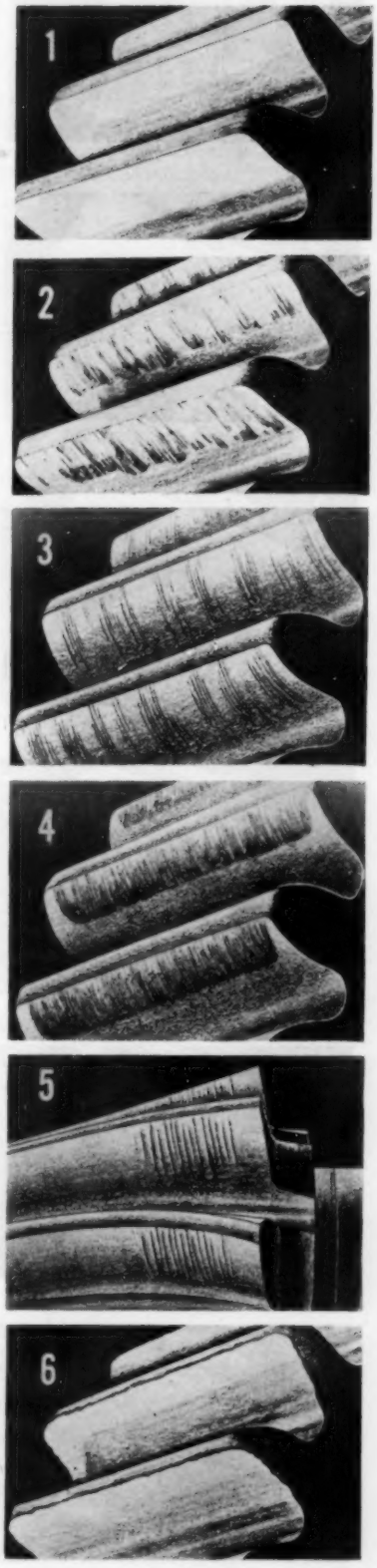
Plastic Yielding is a deformation of tooth surfaces resulting from heavy loads, characterized by fins on the tip edges or ends of the teeth (not to be confused with shaving fins), and an occasional ridge and matching groove on the mate at the pitch lines. It is usually associated with ductile materials, but actually occurs with hardened steel as well.

TYPE 6 — *Rolling* is a form of plastic yielding resulting from heavy, even loads and sliding.

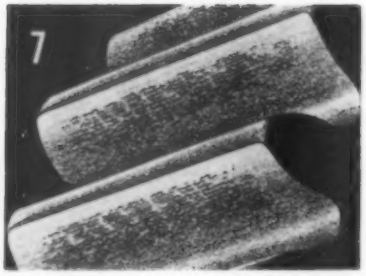
Peening is a form of plastic yielding caused by localized impacts or by uneven heavy or shock loads.

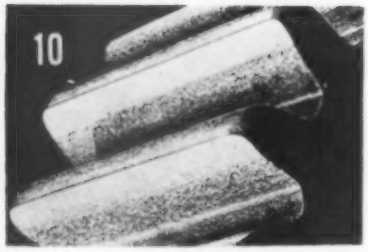
TYPE 7 — *Rippling* is a form of plastic yielding over areas of case-hardened steel surfaces under heavy sliding load, characterized by a fish-scale pattern.

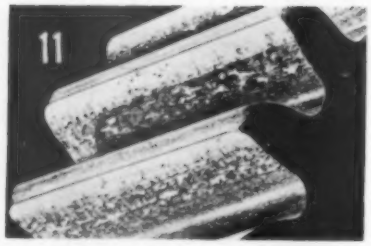
Welding is a general kind of surface deterioration occurring when pressure, sliding, and rise of temperature combine to cause the lubricating film to be forced out, allowing metallic surfaces to rub directly against each other to the extent that molecular adhesion, or welding, occurs, fol-



[5] According to American Gear Manufacturers.







lowed by immediate tearing apart. Welding can frequently be avoided or arrested by the use of a suitable extreme pressure lubricant.

TYPE 8 — *Slight Scoring* is a minor impairment of the surface of a welding nature, showing slight tears and scratches in the direction of sliding, and starting at an area having a high combination of surface stress and sliding velocity generally occurring at or near the tip of the tooth. (The term *scoring* has been selected in this nomenclature, in preference to scuffing, seizing, galling, roping, etc.)

TYPE 9 — *Severe Scoring* is a more advanced degree of welding, showing deep scratches and adhesions, and leading to rapid deterioration.

Surface Fatigue is the formation of cavities in the surfaces of the teeth, usually quite small at first and at separated areas of high compressive stress often due to surface irregularities.

TYPE 10 — *Initial Pitting* may occur when a pair of gears is first started in service, and may continue only to the stage when local high spots have been reduced, so that there is sufficient area of contact to carry the load without further impairment. This type of pitting, according to experience, is not necessarily serious, being corrective and non-progressive.

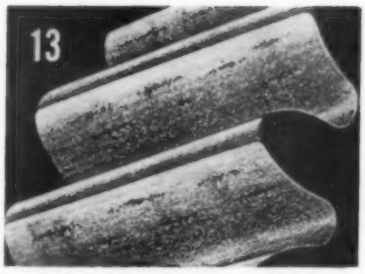
TYPE 11 — *Destructive Pitting* is the type that continues to progress after the initial period of operation, often at an increasing rate, to the degree that remaining unpitted areas are insufficient to carry the load, and rapid destruction may occur by continued operation.

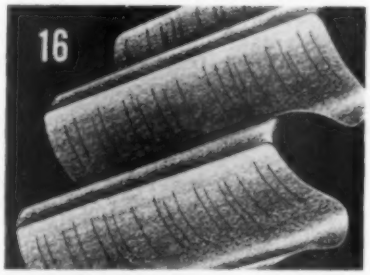
TYPE 12 — *Spalling* is a more extensive type of surface fatigue in which a considerable area of surface is progressively underminded and eventually breaks out in small or large flakes. It seems to occur only in case-hardened gears. Spalling may start at a crack in a way similar to pitting, and does not necessarily follow the junction between case and core.

Miscellaneous Forms of surface deterioration.

TYPE 13 — *Corrosive Wear* is the result of chemical action on metal tooth surfaces by improper kinds of lubricants, by either acid or alkaline contamination, or by oxidization, the effect of which may be accelerated by excessive moisture in gear cases.

TYPE 14 — *Burning* is a discoloration and loss of hardness resulting from high temperature produced by ex-





cessive friction, caused by overload, overspeed, lack of backlash, or faulty lubrication.

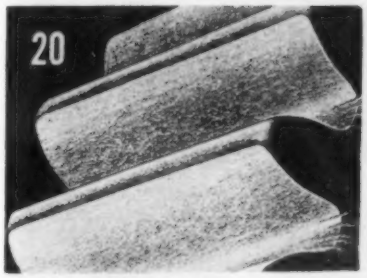
TYPE 15 — *Interference* is a type of failure due to extremely heavy tooth contact on a limited area, caused by improper tooth action, such as excessive heavy contact between the tip edge of one tooth and the fillet surface of a mating tooth, which may cause localized abrasion or gouging. Such a condition may be the result of improper design or manufacture, or assembling the gears at too close a center distance for the profile shapes existing on the teeth, or deflection.

TYPE 16 — *Grinding Checks* are fine cracks usually in a definite pattern, caused by improper grinding technique, or improper heat treatment, or both. They are usually not visible until the gears are placed in service.

Tooth Breakage

TYPE 17 — *Overload Breakage* refers to gear tooth breakage as the direct result of an unexpected shock overload—such as may be caused by jamming of other connected machinery—and is of a nature not attributable to improper design, application, or faulty manufacture of the gears.

TYPE 18—*Fatigue Breakage* results from a large number of repetitions of a load (revolutions or cycles), rather than from a single application of a shock load. A fatigue break is of a progressive nature, starting as a short crack which continues to extend until a portion, or a whole tooth, breaks loose. Discoloration and rubbing apparent on the fractured surfaces, if discernible, are indications of fatigue breakage. Sometimes fatigue fractures are characterized by a series of "contour" lines roughly concentric and spreading from a focal point. This area has a smoother appearance than the surface of the final fracture.



TYPE 19 — *Cracking* results from residual stresses induced in hardenable material by faulty manufacturing control, or from improper operating conditions. One cause is too soft a core, or some other form of improper heat treatment. Chipping and flaking represent various forms or degrees of cracking failures in which portions of teeth break out.

TYPE 20 — *Quenching Cracks* result from improper heat treatment, or from extremely sharp fillets or tool marks. They usually start at the roots or ends of the teeth. Deliberate fracturing of such a tooth will show a dark area where the crack existed.

Other Gear Failure Types

Occasionally gear failures occur which are not listed in the above types. The following is an example of such a situation:

A gear from a truck transmission showed excessive wear. The gear and a sample of the used lubricating oil were sent to the laboratory for examination. The oil was found to be in good condition and did not contribute to the failure.

A cross section was made through one of the gear teeth (see Figure 5a). The dark band around the edge of the tooth shows depth of carburization. (The mottled background around the tooth is bakelite in which the tooth was mounted.)

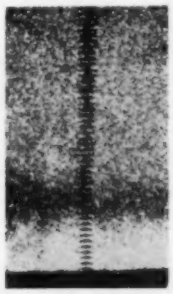
The depth of carburization was adequate for this application but further investigation was made. A hardness traverse was made across the carburized zone, as indicated by the white band on the photograph. The enlarged photograph of this traverse (see Figure 5b) shows individual indentations made by the hardness tester.

The hardness readings were plotted against distance from the edge of the tooth (see Figure 5c). The peak hardness was about .6mm below the surface. This is normal for a carburized surface. However, in this case the outer skin was much softer than usual; in fact it was softer than the core metal.

The outer skin apparently had insufficient carbon and it is suspected that it had been inadvertently decarburized during heat treatment (possibly caused by too much oxygen in the furnace). It is also possible that hardness of the surface changed during service. Whatever the cause, the soft outer skin with its low strength could not carry the required load, and excessive wear took place.

CHOOSING A LUBRICANT

Since at the present time there is no suitable formula for arriving at the proper lubricant to use on specific gears, the choice is usually made after consultation with various



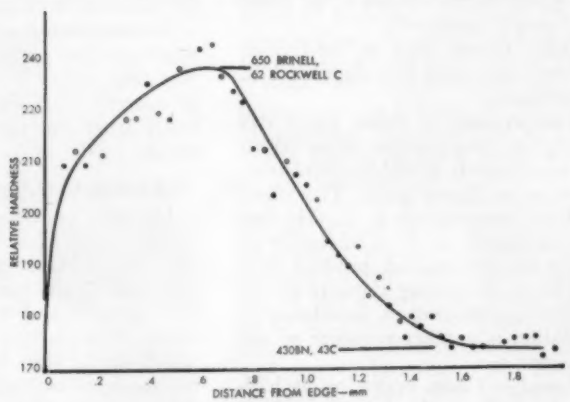
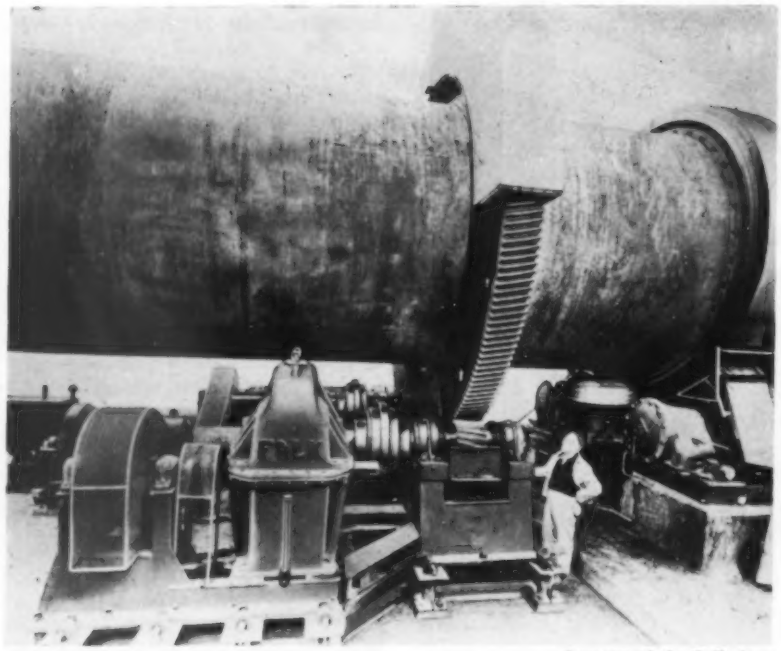


Figure 5—Above: (a) Cross section of gear tooth showing depth of carburization and location of hardness traverse. Center: (b) Enlarged photograph of hardness traverse showing individual indentations. Right: (c) Hardness readings at various distances from the edge of the tooth.



Courtesy of the Falk Corp.

Figure 6—Cement kiln drive for dual pinion and dual set of speed reducers, motors, and couplings.

groups interested in the lubrication problem.

1. The gear manufacturer usually depends on previous experience with certain types of lubricants; he prefers those which he knows have performed well in similar service in the past.
2. The manufacturer of equipment in which the gears are used also is usually consulted.
3. The user of the gears, of course, can apply whatever lubricant he wishes (after the guarantee period), but it is of utmost importance to have the right lubricant in his equipment.
4. The lubricant supplier likewise, on the basis of field experience, has definite ideas as to the best lubricant to use; however, his recommendation should be tempered by the desires of the other people involved.

Other factors such as the following may also enter into the choice of a lubricant.

Temperature — Some gears run at higher temperatures than others for reasons such as high ambient temperature or heavy loads. The effect of high temperature is to thin out the lubricant; so it is advisable to use a heavier bodied product that will have the proper viscosity at the operating temperature. Resistance to oxidation is another requisite of the lubricant.

Speed — Gears operating at high speed usually need a lubricant of reduced viscosity to provide adequate lubrication, cooling, and operation with minimum tooth friction. Under lower speed conditions, however, heavier lubricants are required according to the prospective operating temperatures. Friction is of less consideration when lower speeds are involved; the ability of the lubricant to follow or train with the teeth and maintain a complete film is more important.

Method of Application — This will determine to a great extent the type of lubricant.

Load — The load or pressure to which gear teeth may be subjected must be considered when deciding upon the viscosity or body of the lubricant. Heavily loaded gears require higher viscosity, more adhesive-type lubricants. Such products provide a cushioning effect to offset the effect of tooth impact.

Contamination — The entrance of water or other contaminants into the lubricant makes it necessary to use lubricants that can be separated easily from the contaminating materials.

METHODS OF APPLICATION

Ideally speaking, gears should have oil-tight housings that will keep out contaminants and keep in the lubricant. This, however, is not always possible, and the lubricant often must function under conditions which are far from ideal. The following methods of application are used in various gear assemblies:

Circulating System — A pump delivers lubricant by spray or flood to a location near or directly at the point of tooth mesh. Some operators claim that lower operating temperatures are obtained if application is made after the point of mesh. The pump operates with a separate motor or is sometimes directly connected with the gears being lubricated. This method is suitable to all normal operating speeds. A comparatively low-viscosity product usually is used and an oil-tight housing is required.

Bath System — Enough lubricant is applied to flood several teeth on one gear. The lubricant must adhere to the teeth and carry over to the other gear or gears in the unit. It should be adhesive but not channeling. Gears with pitch-line velocity up to 2,000 f.p.m. can utilize this method. An oil-tight housing is also required for this method.

Idler Immersion — This is similar to the bath system but lubricant is picked up from the sump by an idler and delivered to the gear teeth.

Slush Pan Lubrication—Here the slush pan or sump is located below the lowest gear. The lubricant level is kept at a height sufficient to submerge a few teeth. Lubricant is carried to the point of mesh and delivered to other gears. The oil should be semi-fluid and sufficiently tacky to adhere well to the teeth. This method is suitable for use with semi-enclosed gears.

Intermittent Lubrication — In this method heavy viscous lubricants are applied by paddle, dripping, or pouring. It is sometimes necessary to heat before application. Heavy lubricants are sometimes cut back with solvents to provide easy application by brush or spray. The intermittent method is suitable for heavily loaded gears running at low speeds and can be used when housing is absent or inadequate.

Cut-back-type lubricants containing solvents should be used only where there is ample ventilation. Solvents may have a toxic effect on personnel and in some cases may also present a flammability hazard.

CONCLUSION

Modern gears are being called upon to perform heavier work than ever before, due, very often, to the tendency in industry to speed up production considerably above the rated machine capacity. In many cases this is done deliberately with the knowledge that the expected life of the gears will be shortened, but offset by increase in production.

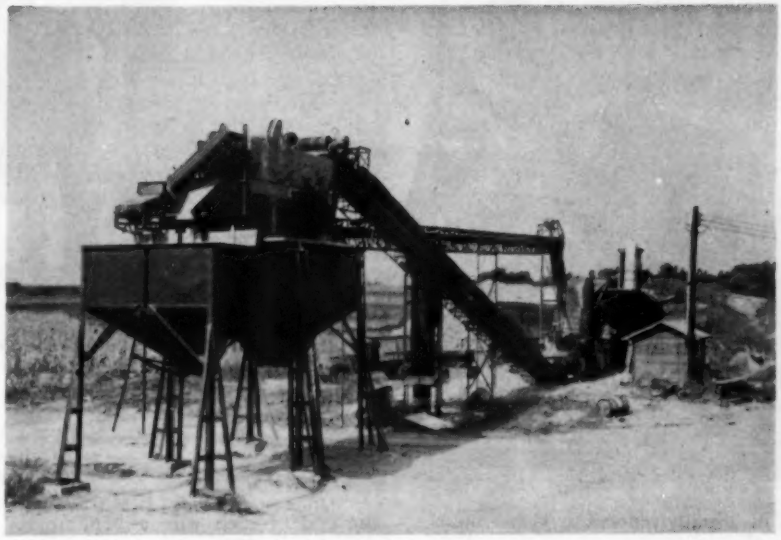
Gear manufacturers, by redesign-

(*Continued on page* 108)

Simple and Compact New Plant Designed Primarily for Production of Road Stone

ONE of the most efficient small crushed stone plants we have seen is operated by the Northwest Stone Company near Fort Dodge, Iowa. The three Yates brothers—John, C. A., and Lloyd—who own this plant were in the earth-moving business as the Yates Construction Company but found themselves with too much idle time between jobs. In looking around for another line which would keep them busy, they decided to go into the production of road stone in competition with local sand and gravel. Only mined limestone was available locally and this was expensive and used almost entirely as concrete aggregate.

In looking for a suitable deposit they found what they wanted 3 miles northwest of the city limits. Having little knowledge of plants, they visited a number of operations throughout the state, finally being struck by the efficiency of a plant operated by the Dillon Stone Company at Columbus Junction, Iowa. Using ideas from this plant and others they had seen, the brothers designed their plant and bought the equipment for it from the James W. Bell Company, representatives for the Iowa Manufacturing Company and other machinery manufacturers. In March, 1953, just two years after they first got the idea, their plant was in operation. This plant was designed for a capacity of 80 t.p.h. on the larger sizes of rock. Actually when producing ¾-in. maximum, it turns out 50 t.p.h. of this and 30 t.p.h. of chips and agstone. When producing ¾-in. roadstone only, using one deck of the screen, capacity exceeds 90 t.p.h.

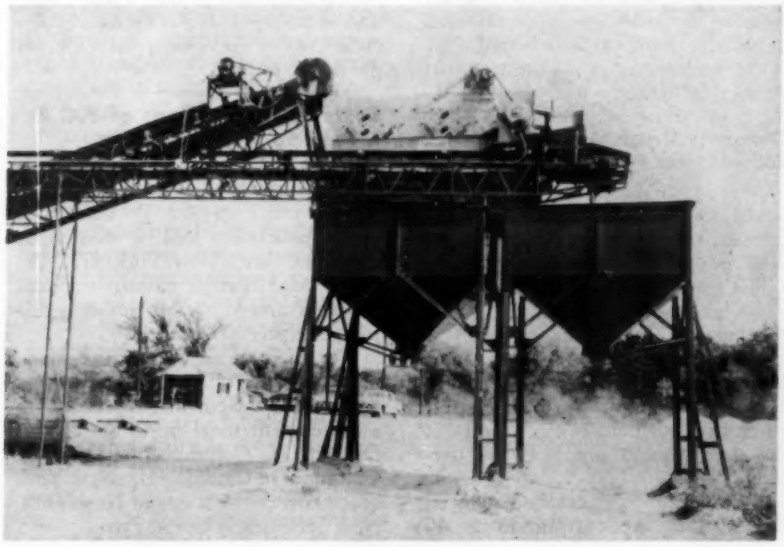


A general view of the Northwest Stone Company's plant, Fort Dodge, Iowa, showing the arrangement of chutes at the screen, and the horizontal conveyor which returns oversize to the crusher.

The overburden on this deposit averages 8 ft. in depth, including 3 ft. of shaly rock over the limestone. This is removed during slack periods by the quarry shovel and trucks. The deposit has 2 to 3 ft. of stratified and broken brown rock under which is a more solid blue-gray limestone extending to an undetermined depth. A 12-ft. face has been developed, and the quarry is drained from a sump hole by a 3-in. Carver pump.

Drilling is done by a Cleveland (Joy) Model DR14 wagon drill using Timken detachable bits. Air is supplied by a 315-c.f.m. Chicago Pneumatic portable compressor driven by a Caterpillar diesel engine. Blast holes are drilled with 4- by 6-ft. spacing, and 20 to 30 holes are detonated at one time, usually in three rows, sometimes in four, blasts bringing down from 800 to 1,000 tons. Holes are started with 2¼-in. bits and bottomed out with 1⅞-in. bits. Dupont 40 and 60 percent Red Cross dynamite in 1½- by 8-in. sticks is used. Millisecond delay caps are detonated by a Dupont No. 50 blasting machine. No secondary breaking of any kind is necessary as the crusher will take rock up to 30 by 30 in.

A Northwest 25 shovel with a ¾-cu. yd. dipper loads the stone into two dump trucks, a Ford and a Chevrolet. These haul about 200 ft. out of the quarry and up an earth fill to the plant. A 3- by 8-ft. Dixie apron feeder discharges the stone into the Cedarapids 3030 double-impeller crusher which is driven by two 75-hp. Century electric motors.



The two truck-loading bins with the screen, the inclined conveyor from the crusher, and the horizontal return conveyor.

Above: Left to right: The three Yates brothers, John, C. A., and Lloyd—in front of the office and scalehouse.

Left: The double-impeller primary crusher with its pan feeder, and the chute from the over-size return conveyor.

This usually reduces to ¾-in. minus; but when coarser stone is desired, the breaker bars are opened up to 1½ or 2 in.

The crushed stone is carried on a 30-in. by 80-ft. belt conveyor to the 4- by 12-ft. Cedarapids 3-deck horizontal vibrating screen. This is usually equipped with ¾-in., ¼-in., and No. 8 cloth. In order to prevent clogging of the bottom deck in wet weather, a 3- by 7-ft. section of old ¾-in. cloth is laid on it, hammering it as the screen vibrates. At the head end of this section, where it is tied down to the screen cloth, the end of each wire is bent up so that there will be no damage to the cloth. The wires on both sides are already crimped; and there is ample clearance on both sides so that the section will not hit the side rails of the screen. This arrangement greatly improves the screening efficiency and produces clean screenings.

The oversize—plus ¾-in.—is returned on an 18-in. by 105-ft. horizontal conveyor to the crusher. The ¾-in. rock off the second deck drops into one of two 21-cu. yd. Pioneer truck-loading bins. The ¼-in. chips off the bottom deck and the minus ¼-in. agstone drop into the two sections of the second bin. All shipments are weighed on a Fairbanks truck scale. Stockpiling is done by truck and reloading by an Oliver tractor with a Lessman loader.

Public utility power is used and all motors are controlled from a station at the crusher, where one man is stationed. The entire crew consists of seven men, including the driller and the scale man. Pioneer belt conveyors with steel framework and Goodyear conveyor belts are used in this plant.

Heavy-Duty Gears

(*From page* 106)

ing, modernizing and using better steels, are now producing precision gears that give better performance than ever before.

Lubricant manufacturers are continuing with extensive research to produce tougher lubricants to keep pace with the increasing demands of industry.

There are limits, however, to overload. Beyond these limits even the highest quality of steels and the most durable extreme pressure lubricants may not be able to function dependably.

The American Gear Manufacturers Association has classified gear tooth failures as shown in their publication *AGMA Standard Nomenclature—Gear Tooth Wear and Failure*, and reproduced as Gear Failure Types 1 through 20 in this article. With these illustrations of what can happen if there is not perfect accord between the lubricant, the steel, and the load conditions, it is hoped that better understanding of the problem of gear lubrication will result.

Company-Union Agreement Ends Huron Portland Strike

At Detroit, Mich., the Huron Portland Cement Company and the CIO United Chemical Workers, Local 314, recently signed an agreement which provided for a 15-cent hourly wage increase and a 40-hour week. Signing of the contract ended a month-long strike called by 40 members of the union which seriously affected work on various Detroit street improvement projects and cut the local cement supply by 50 percent.

Because the company had reduced the working week from 45 to 40 hours, the union objected to the resulting reduction in take-home wages and demanded a 5-cent hourly increase, or a 37½-cent increase on the 40-hour week.

Eastern, N.Y., Offices of P.C.A. Moved to New Location

Effective September 20, 1954, the eastern regional office and New York district office of the Portland Cement Association will be located at 250 Park Ave., New York 17, N.Y. M. J. McMillan is eastern regional manager and W. J. McIntosh is district engineer.

The New York City office is one of 29 district offices maintained by the Portland Cement Association to serve cement users in 46 states, the District of Columbia and British Columbia in Canada. The New York office covers the states of New York, New Jersey, and Connecticut.

American Mining Congress Attracts Huge Gathering in San Francisco

another ON THE SPOT report

SAN FRANCISCO, which a century ago was grubstaking and entertaining a horde of gold miners, again played host in September, 1954, to the modern counterpart of the bearded '49ers. An estimated 6,000 persons engaged in mining, re-

By HARRY F. UTLEY

fining, and beneficiating the ores of the earth gathered in the city for the annual convention and exposition of the American Mining Congress.

Nearly 160 manufacturers of machinery, equipment, and supplies participated in the show, utilizing 65,000 sq. ft. of floor space both within and immediately outside San Francisco's Civic Auditorium.

While the program was of primary interest to metal miners, a number of papers and one full session were devoted to discussions of nonmetallic minerals. Over $2,500,000,000 of product was turned out during 1953 by the nonmetallic mining industry, R. J. Lund of Battelle Memorial Institute, Columbus, Ohio, told the delegates at one of these sessions. According to Mr. Lund, this was an all-time peak for production, and he reported that recent surveys indicate that markets are generally firm and that production is continuing at about 90 percent of capacity. Entry of large companies into the nonmetallic field by purchase or merger of smaller concerns was seen by him as assurance that improvements in exploration, beneficiation, and processing will accelerate in the immediate future.

Recognition of talc produced in the West as a high-grade cosmetic material is growing, Henry Mulryan, president of Sierra Talc & Clay Co., South Pasadena, Calif., declared in a talk before one of the operating sessions. For years only French and Italian talc was used in cosmetics, but by proving to the manufacturers that the quality and uniformity of talcs mined in the West was at least as good as the imported product, Western producers have greatly improved their sales.

The advent of chemical manufacturing in the West lends new significance to the nonmetallic mineral raw materials of the Western states, according to another of the speakers, Fred Lohse of the Kaiser Aluminum & Chemical Corp. Among the raw materials being converted to finished chemical end-products in the West, Mr. Lohse said, are limestone, phosphatic shales, silica minerals, and many salines. These and others are going to get a great deal of attention in the years just ahead, he predicted, since all signs point to an early development followed by a rapid expansion of a true Western chemical industry.

California's annual production of concrete aggregates could fill a train 6,000 miles long, declared E. L. Howard, testing engineer, Pacific Coast Aggregates, Inc., San Francisco. To supply the exacting types of aggregates demanded today requires extensive sampling and testing, he continued. "Qualities required in today's aggregates must meet rigid tests for soundness and durability, and no amount of processing can improve an aggregate that fails to meet these requirements in the pit from which it is extracted." Demands of buyers vary, he pointed out, because much construction work is done by federal, state, and local governmental agencies. Each has his own idea of what is desired; in the San Francisco area alone seven coarse aggregates and five sizes of sand are specified.

Diesel-powered highway trucks have been successfully converted to underground operation in the mine of the United States Potash Company at Carlsbad, N. M., Earl H. Miller, company official, told the delegates. The conversion, required by low haulageway ceilings, was done by removing the cab and hood and putting the driver's seat, steering gear, instruments, and other controls outside the frame on the left side of each truck and low enough so that a 6-ft. driver, when seated, clears the 5½-ft. roof. Diesel engine use underground is made possible by the use of exhaust scrubbers which cool 850 deg. F. exhaust gases to less than 180 deg. F. and remove objectionable aldehyde odors. Carbon monoxide is reduced, he said, to less than a trace in the mine air by keeping the engines in good repair and adjustment.

Southern California aggregate producers have reduced their accident-frequency rate 32.7 percent in the three years ending in 1952, Ronald C. Griffin, production manager of Consolidated Rock Products Co., Los Angeles, declared at a conference session devoted to safety. To lower

One part of the exhibit area outside The Civic Auditorium, San Francisco, where the American Mining Congress was held this year.

the rate, the southern California aggregates and ready-mixed-concrete associations, embracing 27 companies, created a safety committee which is functioning effectively within the participating concerns.

Industrial accident prevention as an organized effort is over 40 years old but is reaching only 10 percent of the nation's employed personnel, Leonard R. Flicker, senior safety engineer of the Permanente Cement Co. told those attending the safety session. "The true picture of the cost of accidents is seldom realized. Actual costs of an accident can usually be arrived at by multiplying the compensation and medical costs by five, to account for the many hidden costs not covered by insurance," Mr. Flicker revealed.

A discussion of rotary drilling was presented by Lewis A. Parsons, consulting engineer, Calaveras Cement Co., San Francisco. Economies in blast-hole drilling became imperative, Mr. Parsons explained, when his company decided to treble the capacity of the Calaveras plant near San Andreas, Calif., to its present requirement of 10,000 tons of crushed stone per day. In December, 1951, the company purchased its first rotary-drilling unit, which resulted in such economy and increased tonnage that the company, two years later, acquired one of the largest rotary drills on the market, a Bucyrus-Erie 50-R machine.

An important factor in the cost analysis at the Calaveras quarry, Mr.

Lewis A. Parsons, consulting engineer, Calaveras Cement Co., who discussed rotary drilling.

Parsons said, is that the stone breaks easily with good fragmentation upon blasting, so that the larger hole can be used very effectively. This results in a substantial decrease in production cost per ton. He said that spacing of the 9⅞-in. holes is on 21-ft. centers, resulting in breakage of 35 tons per ft. of depth, with an average powder consumption of 0.33 lb. per ton broken. Figuring savings based on direct costs alone, Mr. Parsons estimates the drill paid for itself in 212 days.

Advanced design features in wet cyclones for classification were revealed in a symposium paper by Kellogg Krebs, head of Equipment Engineers, Inc., San Francisco. These include the use of molded, replaceable gum-rubber linings and the use of cast-steel, precision-machined sweeping inlet heads fitted with rubber liners for greatly improved performance. Cylindrical form is employed in the Krebs cyclones since this is the dynamic pattern in the fluid mechanics of a cyclone. Units are convertible from single to 2-stage operation. Full-scale tests in the range of 2 to 50 t.p.h. by recycling have been carried out during the last five years both in the laboratory and in the field, Mr. Krebs revealed.

Posing at the Allis-Chalmers Manufacturing Company exhibit are (left to right): Grant Metzger, manager, Calaveras Cement Co. plant at San Andreas, Calif.; R. S. Stevenson and C. W. Schweers, both of Allis-Chalmers; William Wallace Mein Jr., Calaveras president; and O. V. Talley, Allis-Chalmers. Shown in the foreground is a working model of the Calaveras plant.

Sept. Construction Totals Pass $10,000,000,000 Mark

New construction activity throughout the United States in September matched the all-time peak volume of $3,600,000,000 achieved in August, to round out the most active quarter on record for the construction industry, according to preliminary estimates prepared jointly by the U. S. Departments of Commerce and Labor. The value of new work put in place during that month brought the third quarter total to $10,750,000,000, 7 percent more than in the July to September, 1953, period. After adjustment for seasonal factors, new construction activity in the third quarter of 1954 was at an annual rate of $37,500,000,000, as compared with an annual rate of $36,300,000,000 in the first 6 months and actual outlays of $35,300,000,000 in 1953.

Private residential building continued at a near-record level in September, edging up to $1,300,000,000. Over $3,800,000,000 of new residential building was put in place from July through September, 15 percent more than similar outlays in the third quarter of last year. Private industrial building activity held steady in September, following an almost continuous decline since early 1953. Third quarter industrial building volume was 9 percent less than in the same period of a year ago. Commercial building continued at a record-breaking rate in September, exceeding the $200,000,000 mark for the third consecutive month.

Total construction activity during the first nine months of 1954 amounted to $27,400,000,000, a new record for the period and 4 percent above the same months of a year ago. Private outlays, at $18,800,000,000, were 6 percent higher than in January to September, 1953. Public expenditures for new construction through September, $8,600,000,000, were about the same as in 1953.

This Sanford, Maine gravel pit equipped with an Austin-Western 201 Plant is making three products simultaneously . . . 3/4" to 1 1/2" (at right), minus 3/4" (at center) and minus 1/2" (scalping screen).

Across the country **AW** owners agree: If you **COMPARE** before buying... you'll choose an **AUSTIN-WESTERN** plant!

You know from experience that there are a lot of differences in crushing and screening plants. That's why you should compare carefully the leading makes of portable plants, looking particularly for the things which are needed for trouble-free operation and low-cost output.

A thorough comparison will convince you that Austin-Western's plant is the one for you. You will like its rugged construction, superior jaw and roll crusher and ready portability.

Here's proof that it will pay *you*, to *compare* crushing and screening plants before you buy. Study the chart in this ad and you'll see how much more you'll get with an Austin-Western crushing and screening plant. Call your A-W distributor or write us right away for further facts. Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Why it will pay you to **COMPARE** before you buy

COMPARE . . .	A-W	Make "X"	Make "Y"	Make "Z"
Welded Steel Plate crusher frame for high strength without weight of cast steel frame	Yes	No	Yes	No
Machined steel toggle plate for absolute protection instead of cast iron	Yes	No	No	No
Inclined positive-throw type vibrating screen	Yes	Yes	No	Yes
Dustproof and watertight brakes on outside of wheels	Yes	No	Yes	No
All bearings of anti-friction type	Yes	Yes	Yes	Yes
Single source for wide range of complete stationary or portable plants, crushers, matching screens, elevators, conveyors and bins	Yes	Yes	No	No
Total	100%	50%	50%	33⅓%

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Statue of "The Grinder", represents a Scythian slave whetting a knife on an irregular shaped, natural sharpening stone.

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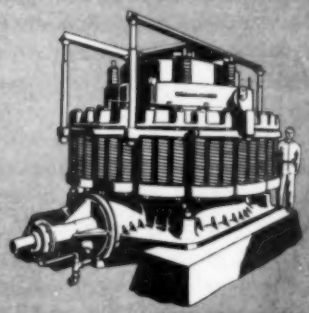

SYMONS* Cone Crushers . . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter —in capacities from 6 to 900 tons per hour.

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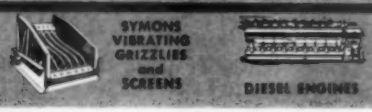

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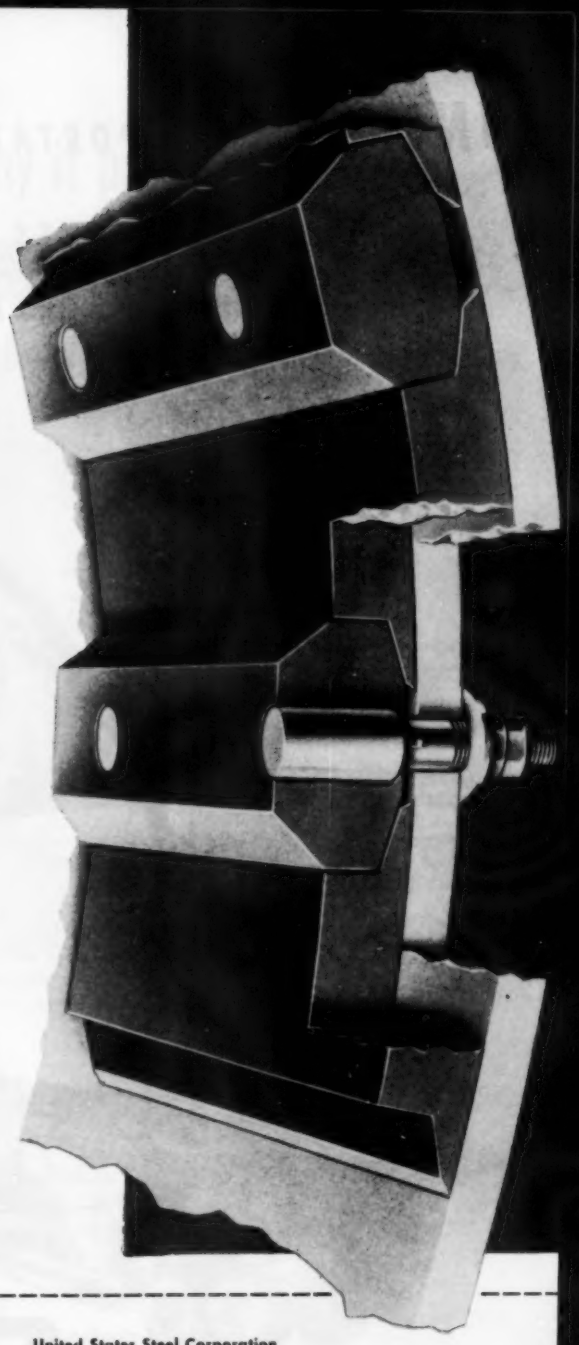

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You get longer, uninterrupted service with USS Lorain Rolled Plate Linings because tight fit between the ends of the plates and between the plates and lift bars eliminates shell wash and allied troubles that eventually cause costly repairs.

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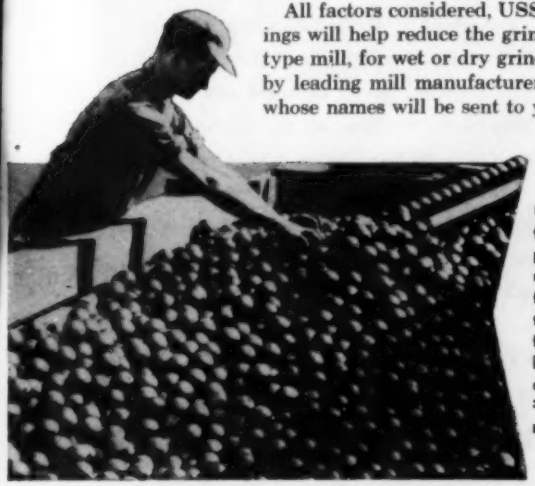
You get maximum length of service from each USS Lorain Rolled Plate Lining. And severe localized wear at the feed or discharge ends can be easily compensated for by reversing the worn plates at opposite ends.

All factors considered, USS Lorain Rolled Plate Linings will help reduce the grinding costs-per-ton, in any type mill, for wet or dry grinding. They are distributed by leading mill manufacturers throughout the country whose names will be sent to you upon request.



USS Grinding Balls are carefully made of special composition steel to take long, rough wear evenly. Samples from each production lot are thoroughly checked for surface hardness and maximum hardness penetration. They are available in sizes from ¾" to 5". For further information, mail the coupon.

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USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

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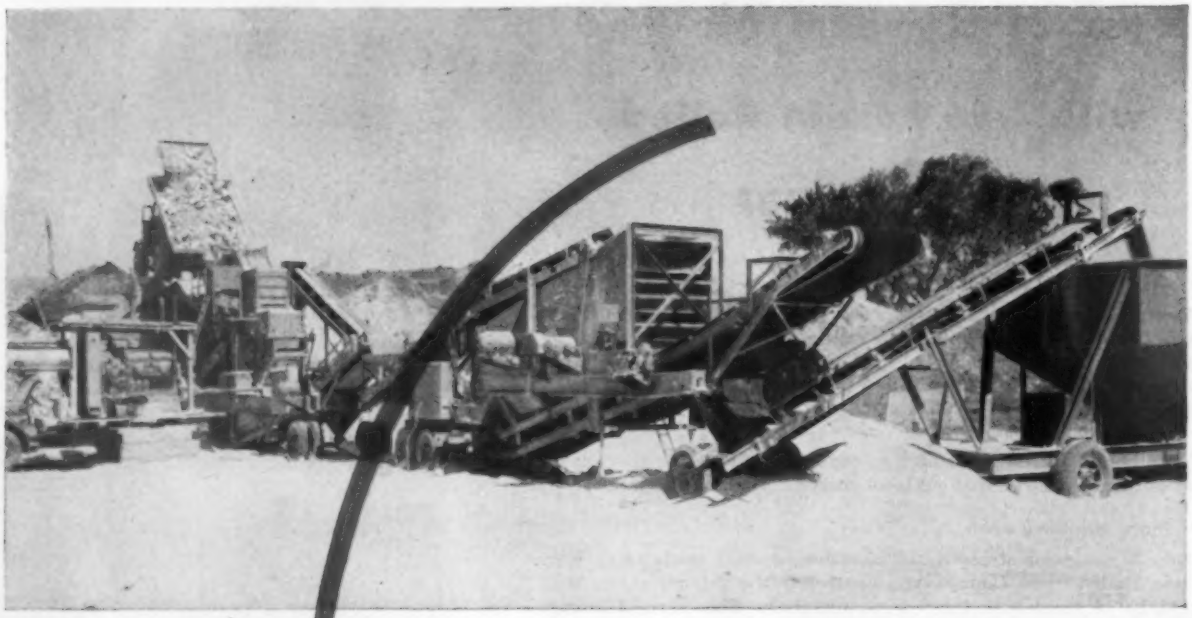
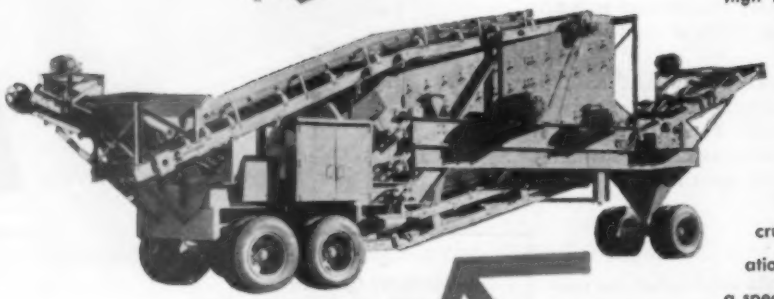
UNITED STATES STEEL

UNIVERSAL PORTABLE SCREENING AND BLENDING UNIT INCORPORATES SIMPLICITY 5'x14' 3-DECK SCREEN WITH BALL TRAY





At the Anderson-Oxandale aggregate plant in Herington, Kansas, they're getting exceptionally high tonnage of good quality aggregate for State road requirements with a Universal crushing plant and portable screening and blending unit. Heart of the screening and blending unit is a Simplicity 5' x 14' 3-deck inclined gyrating screen equipped with a ball tray deck. Handling up to 150 yards of crushed dolomite limestone an hour at this operation, the 70 square foot Simplicity screen produces a specification aggregate consisting of 100% passing 1", 90% passing ¾" and 50 to 60% passing ¼". Specification of product can be easily varied according to job requirements. To our knowledge this is the largest screen offered in a portable crushing and screening plant.

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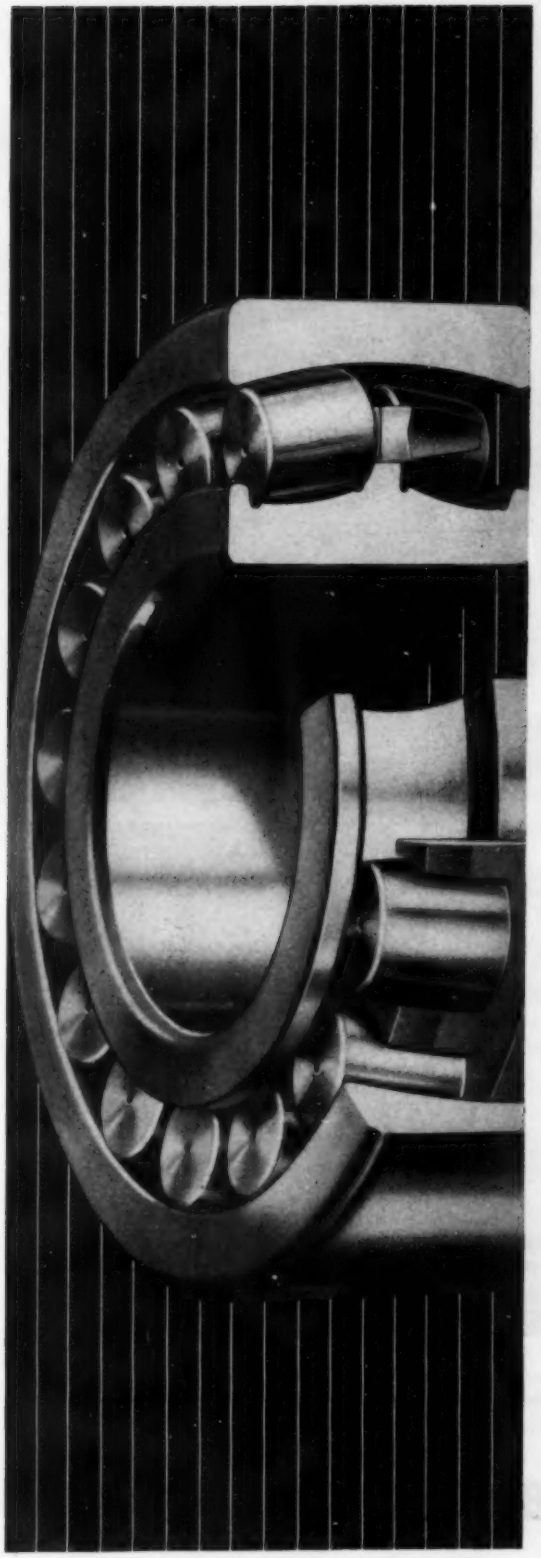

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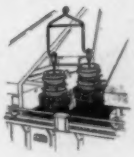

Races and rollers heat treated according to the most advanced metallurgical procedures—for maximum durability.

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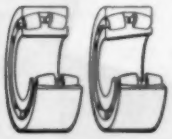

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These are advantages that give you long, efficient, low-maintenance service in the toughest heavy-duty application. **To get maximum value for your bearing dollar,** ***specify TORRINGTON Spherical Roller Bearings.***

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"Nitramon"® gives a maximum of safety

...cuts secondary blasting to a minimum

Shot after shot, you're sure of good breakage and safer operations with Du Pont "Nitramon" ammonium nitrate blasting agent. Here's another example: a 97,600-lb. coyote blast at a large eastern traprock quarry. Operators were able to handle and load charges quickly, easily and safely, as "Nitramon" is non-headache-producing and permits use of electric lighting in the tunnel.

Nearly 300,000 tons of well-broken rock was the result (see photo at right), and it's typical of the excellent fragmentation being obtained. "Nitramon" has greatly reduced the amount of secondary blasting required—and men work with the assurance that it cannot be detonated by fire, friction or sudden shock.

So convince yourself—put Du Pont "Nitramon" to work in your own quarry. You'll find it gives you all the blasting power you need . . . makes for greater safety . . . and saves you money. Write or phone the Du Pont Explosives man in your district for complete information. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Thermoid Hose designed specifically for use in quarries

Thermoid designs and manufactures many types of hose built to give longer service and lower operating costs in a wide variety of specific applications. Here are three that are ideal for rugged quarrying and construction work:

THERMOFLEX—Mandrel-built air hose for extreme service and direct connection to compressors. Smooth, black abrasion-resistant cover.

VERSICON—Most versatile hose ever developed. Handles air, water, oil, gasoline, dilute acids and gases. Ideal for use with air-operated tools.

#325 CL SUCTION HOSE—Heavy duty wrapped hose reinforced with rugged wire enclosed in a woven cord carcass. Long wearing tube and cover resists weather and abrasion. Can be restored to shape after crushing.

Thermoid research is responsible for new, better hose construction which makes Thermoid Hose more durable . . . easier to handle. Quarrying and construction work also demands the best in Conveyor Belting and Multi-V Belts. Ask your Thermoid Distributor for complete information on all these Thermoid Products. Or if you prefer, write direct.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

WANTED—A-1 SALESMEN! Peddlers Keep Out!

National Gypsum trains men to do a selling job—

Melvin H. Baker, chairman of National Gypsum Company, hates a peddler. It's a bad word in his lexicon. He makes a sharp distinction between a peddler and a salesman. He thinks, however, that a salesman

By JOHN W. BROWN
Vice-President in Charge of Dealer Sales
National Gypsum Company

is never really baptized except in the hot fire of a competitive market.

A year ago National Gypsum's sales were riding along at a lush 17 percent ahead of the previous year. Cause for complacency? No. Mr. Baker had his eye on several hard facts of his company's business life: (1) The building materials industry, still high on the crest of the construction boom, was nevertheless headed for the shoals of tight competition. (2) In that kind of competition the choicest new markets are those you grab from your competitors. (3) 85 percent of National Gypsum's field force of salesmen had never sold in a competitive market like that of the '30's. They weren't peddlers—Mr. Baker wouldn't have any around—but neither were most of them salesmen, by his exacting definition.

So last fall Mr. Baker—who conjured up the National Gypsum Company 30 years ago out of nothing but his own genius for selling—decreed that a special sales training school be set up for all of National Gypsum's 500-odd salesmen. For Mr. Baker, who runs the company with the minimum of protocol, that meant not only line salesmen but district sales managers and the newly-established crew of division sales managers who now virtually run the field force under a recently decentralized setup. W. W. Hildinger, general sales manager, and the author were to be responsible for the program. T. D. Fallon was appointed director.

We believe that this sales training program is unique in several ways:

(1) Certainly no program could have had more encouragement and inspiration from the pinnacle of management. Mr. Baker, the chairman, conceived the idea. He is also a conscientious member of the faculty, as are other members of top management, including President Lewis R. Sanderson.

John W. Brown, vice-president in charge of dealer sales for the National Gypsum Company, started out as a salesman, and therefore has a keen appreciation of their problems and needs.

(2) This is not an "indoctrination" course to break in new salesmen to the business. No salesman is eligible to attend school until he has had at least six months in the field. Even the crustiest old timers have to take the course. Most important, the education process is never allowed to stop. *All* salesmen for *one week every year* will be obliged to return for a refresher course. Other follow-up devices include a news bulletin of useful case histories and "how-to's" circulated periodically to all salesmen and regular sessions at the division managers' headquarters.

(3) There is a lot more to the course than simply acquainting the salesmen with company sales policy and the company's products and those of competitors. There is a premium on cross-fertilization of ideas. Production, research, advertiisng, finance, and all other aspects of the company's operations are illuminated by various members of the faculty representing all departments.

(4) Stress is placed on *articulation*. The student salesmen are required to write a theme every day on some sales topic. We feel that this not only helps them with their business correspondence but also forces them to crystalize the ideas they have absorbed in the course.

(5) There is *no school solution* to the problems presented in the school. Using the "case history" method, faculty members try to stimulate and provoke discussion on knotty sales problems. They don't, however, inject any arbitrary solutions which might frustrate and discourage the students' enthusiasm and confidence.

The school otherwise has most of the routine features. There are two classrooms in the company's Buffalo headquarters. The one used for lectures is furnished with all the visual aid devices; the other is a workshop rigged for application by the students of all National Gypsum Gold Bond products and those of the competition.

The workshop is completely furnished with sections of exposed lath, joists, studs, etc. On these the students apply plaster, wallboard, acoustical materials in a setting which acquaints them with dealers', builders', and architects' problems. Most important, probably, is the consumer consideration in the "do-it-yourself" boom. The more the average homeowner gets into building for himself, the more important it is for the salesman to get across the lesson of proper installation. This is the only way, Mr. Baker believes, in which National Gypsum's Gold Bond materials can maintain their reputation and increase it.

There are 45 faculty members for the school, which runs all year at the rate of about 20 two-week sessions a year. It's a solid two-week course, with classes running daily from 8:15 a.m. until 10 p.m. Such is the enthusiasm generated in the classroom that few students have been known to gripe at the rugged hours. The first half-hour of each day is devoted to tests. Papers are graded and diplomas awarded at the close of each session.

A glance at the two-week cur-

riculum reveals the philosophy behind the program. We spend about 50 percent of the time on specific product and service education and the rest on confidence building. Confidence, of course, is the salesman's most indispensable asset. The course stresses the qualities that make up confidence — the salesman's general knowledge of company, industry, and market conditions, and his enthusiasm.

Here are a few samples of product subjects studied through lectures, films, demonstrations, discussion sessions, and actual construction participation: "How to Sell and Service the Plastering Contractor," "How to Get Best Results With Lime Putty," "Gypsum Specialties and Construction Systems," "Metal Lath Construction," and "Gypsum Wallboard and Joint Treatment."

The general knowledge subjects include topics such as the following: "Why Not Write Up Orders Right?" "How Research Helps Sales," "How to Ask a Customer for Money (on Credit)," "How to Use Advertising to Get an Order," and "Quality Control."

Technical jargon is cut to the minimum in the lectures and the study materials, and the classes are spiced with human interest appeal and a heavy lacing of laughs. The informality of the classroom helps to stimulate participation by all the students, and the small size of the class overcomes inhibitions against speaking up.

Classes average about 20 students. They sit comfortably around rectangular tables (three to a table) in a specially designed conference room in the company's home office building in Buffalo.

Probably the most interesting single phase of the curriculum for the students is the case history study. Usually it starts out something like this: "You, Joe Blow, are a Gold Bond salesman," and goes on to outline the problem. There is a battery of ten such cases in the two-week course; and the beauty of it from the student's viewpoint is that anyone with sales experience can make useful contributions to the discussion.

Melvin H. Baker, chairman of the board, presents a diploma and extends his congratulations to A. R. Doll, a graduate of the course in salesmanship.

Although the problems are usually knotty, they all illustrate some practical situation which any salesman is likely to encounter. They may include such topics as handling complaints, getting the business of a large residential development, re-establishing lost customers, getting a new customer who has been long "married" to a competitor. These are typical case subjects. All the theory introduced in the course, as well as the salesmen's own experiences, are brought to bear on the problems. The school is a forum from which all participants benefit.

For the salesmen, who are usually more adroit with the tongue than with the pen, the composition writing is perhaps the least intriguing of all the subjects offered. Nevertheless they manage to perform dutifully and creditably on such topics as "Why Customers Buy," "How I Make My Quota," and "How to Turn a Complaint into an Asset."

How about results of the program, which has been in force for about a year? A lot of the old timer "anti-intellectuals" around the company laugh when this question comes up. In 1953 sales ran approximately 17 percent higher than in 1952. Everybody expected a slowdown in 1954 as a result of the tougher competition anticipated. Actually, this year's sales, while showing a drop in the *rate* of increase—6 percent—are still well above the 1953 figures.

We can point to several solid advantages of the training program to National Gypsum's sales organization since the school was established.

(1) Sales are well ahead of last year and heading toward another record.

(2) There have been fewer complaints from customers than ever before. Salesmen's service is quicker and they are better informed.

(3) Partly because of the training program, and partly because of the decentralized system of regional division sales managers, the intelligence coming to Buffalo from the field is more reliable and more informative than formerly.

(4) Morale is up among the salesmen. Getting to the Buffalo headquarters at least once a year gives them a greater sense of identification with the parent concern and a more intense loyalty to it.

With this tough market here to stay for a while, we can feel pretty lucky to have a force of salesmen with the zeal these boys have. We put them up at the Buffalo Sheraton in rooms complete with television sets. But not many of them ever get to see any programs. After 14 hours in the classroom they still spend their nights in "bull sessions" on sales.

In spite of the tight competitive situation, we believe that this sort of enthusiasm can show a lot in the way of results in the next 10 years. Construction is going on at the rate of $37,000,000,000 a year; and it looks doubtful that the rate of housing starts will fall much below the present 1,200,000 a year for a long time to come.

Although it might be hard going for a "peddler", there will still be enough business around for a well-trained salesman to get fat on.

Dean Thomas D. Fallon explains to a class the theory behind the sales training school, that a good salesman must know his product and his market.

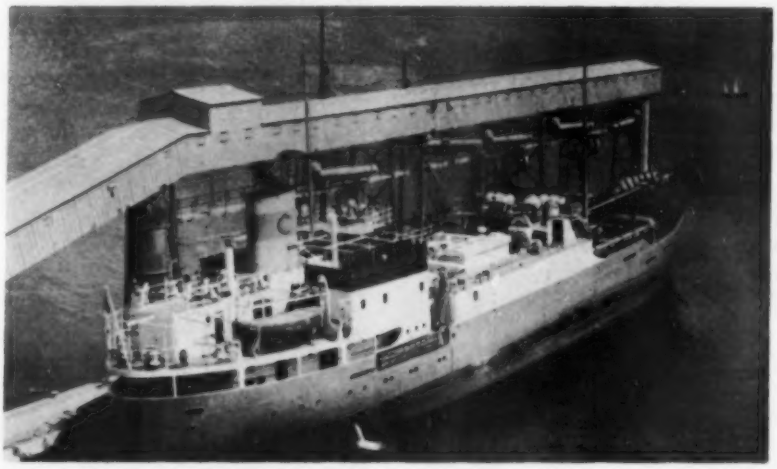
SKANSKA'S ROBOT CEMENT SHIPS FEATURE ENROUTE BAGGING

another P and Q exclusive

AUTOMATIC handling of bulk cement in ships, an old story in United States, has struck out in new directions in Sweden, to make it more efficient and less expensive.

When the largest Swedish cement manufacturers, Skanska Cement Corporation, Stockholm, decided in

By GEORGE ED WILLIAMSON
Bjarred, Sweden



The M/S "Ostanvik", Skanska Cement Corporation's second robot cement ship, loading in the harbor of Slite, Sweden. This vessel, built in 1949, was remodeled two years later for enroute bagging.

1948 to turn to bulk shipping, officials first studied the methods used in United States, which up to that time depended chiefly on conveyor belts or pneumatic systems. However, it was felt that these methods did not meet the firm's needs. Skanska therefore called on Nordstroems Linbanor, materials-handling engineers at Stockholm, who worked out a discharging system based on a principle that was entirely new in this context —the worm-screw.

According to N.L. engineers, the pneumatic system used in the United States requires more power than their purely mechanical system. Moreover, the pneumatic system requires that the boat's hatches be opened by stevedores and that the suction hoses be moved by personnel in the hold. In Nordstroems Linbanor's system the hatches remain closed and no stevedores need go on board. The entire discharge on loading is handled by one man sitting before a control panel.

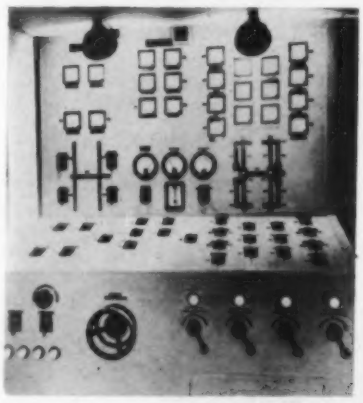
The cement system, unloading bulk, discharges at the rate of 210 t.p.h., requiring a total of 80 hp. to drive the system. Compared to the scraper system which is popular in the United States, the worm-screw system has the advantage of discharging in all weather conditions, as it permits the hatches to remain closed. The system is also dust-free, while the scraper system is not.

With the rebuilding of one boat, the *Vika I*, in 1948, Skanska Cement began a series of improvements in cement handling which culminated in the rebuilding of the *Ostanvik*, which was put into bulk cement service in 1952.

The development of a ship which could take bulk cement on board and pack it enroute was not just a step toward further "robot" handling of cement, but the solution to an entire traffic problem that included such questions as how to keep reserve ships busy.

The cement makers' first step toward bulk handling was decided on in 1948, at the time they built a plant at Stora Vika, south of Stockholm. It was decided not to install a large bagging plant at the Vika factory, but to transport it in bulk to Stockholm, where it could be forwarded in bulk to larger customers, or bagged for smaller customers.

Therefore, the *Vika I*, which had been hauling sacked cement, was rebuilt for bulk cargo, using the worm-screw principle designed by Nordstroems Linbanor. The ship, carrying 1,450 metric tons in Baltic traffic and 1,850 in Archipelago traffic, was able to make six voyages a week, transporting about half a million tons of cement a year, which was both more than the plant's capacity and more than Stockholm's consumption at the time.



The control panel for the automatic loading and discharging system on the carrier "Ostanvik".

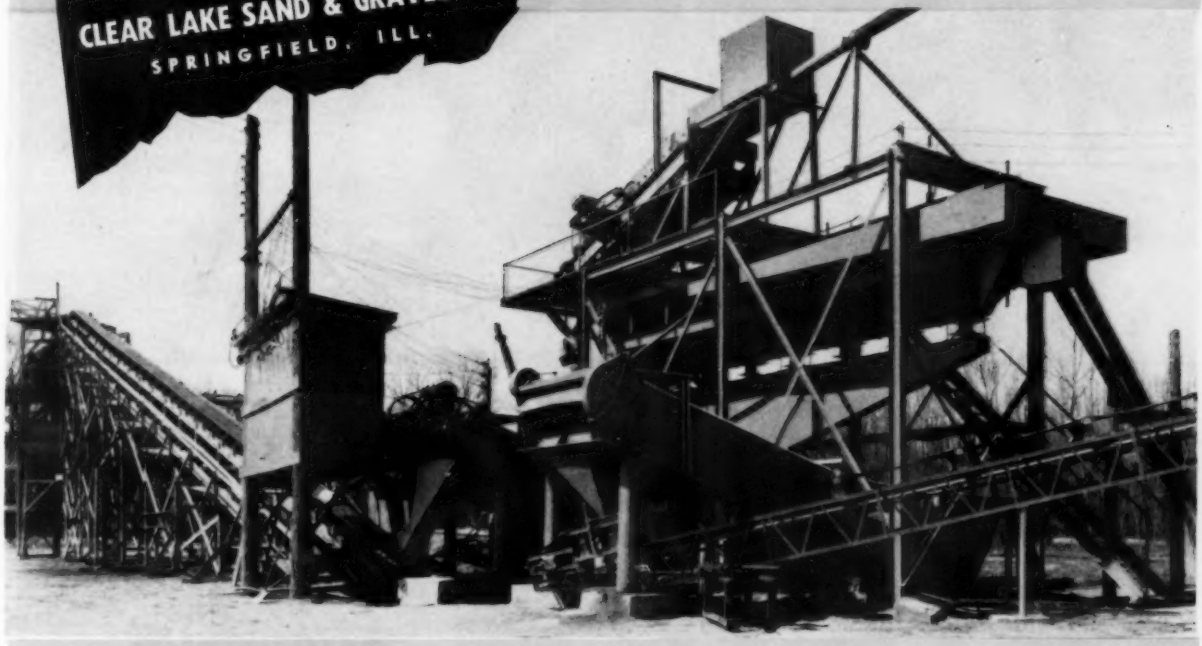
The rebuilding of *Vika I* permitted a 98 percent saving in labor over the transport of bagged cement, and the 2 percent labor that remained consisted only of overseeing work. Moreover, the loading and discharging could be carried out irrespective of weather or time of day. The ship was also designed for conversion to a piece-goods carrier.

Conversion to bulk hauling, however, presented the company with the problem of what to do in case *Vika I* sank. It would be difficult to salvage a ship that had two concrete monoliths in its hold, each weighing several hundred tons; and since the Vika factory had only a small bagging plant, there would be a bottleneck here until another ship could be converted to bulk hauling. For this reason, Skanska Cement decided to rebuild another of its ships, the *Vika II*, into a bulk carrier.

The problem that then arose was how to keep an $800,000 reserve ship profitably occupied. The solution to this was to build a bagging plant on board one ship, so that it could divert work from other sacking plants. This problem was again worked out by Nordstroems Linbanor.

(*Continued on page* 127)

"The Fines We Save Are Paying For Our EAGLE Washing and Classifying Equipment."



CLEAR LAKE SAND & GRAVEL is readily producing material that meets State of Illinois Highway Department specifications by a wide margin. They are retaining 200 mesh material . . . made possible by the Eagle Water Scalping Tank which pre-classifies the sand and removes excess water before passing the material to the two Eagle Double Screw Washer-Classifier-Dehydrators.

One double screw unit processes a coarse gradation of sand and the other processes a fine gradation, down to 200 mesh asphalt sand . . . 1200-tons plus per day. Materials that make the BEST kind of concrete and asphaltic road aggregates.

C. D. "Red" Casten, owner, reports that the fines they are saving has justified installation of the Eagle Washing and Classifying Equipment and is quickly amortizing the investment. Mr. Casten is shown in front of his neat, efficient plant.

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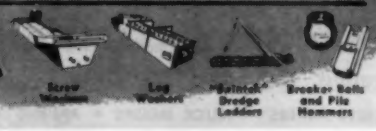


Eagle engineering and profit-proved equipment can solve your problem . . . increase your profits. There's a Qualified Eagle Distributor near you for consultation. He will send us a sample of your material to study and give you a complete report. Write for Catalog 54.

1 Yd. Jaeger Load-Plus working between tracks and stockpile

This loader almost bites its tail

Turns in a radius of only 14 ft. . . .
with instant reverse and at 50% higher speed

When you figure how many times a day a loader backs and turns, you see how a faster reversing, shorter turning machine like this Jaeger Load-Plus gets its high production.

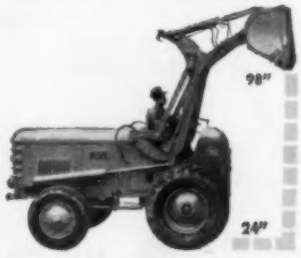
The shift of a directional lever, without any shifting of speed gears, puts it into 50% higher reverse speed. Its power-steered rear axle whirls it in a tight turn of only 14′ radius at both outside rear tire and bucket corner — *2′ 5″ less than its overall length and 3′ to 5′ less than other leading loaders need to turn in.*

From there a Jaeger Load-Plus has 5 transmission speeds to take it up to 28.2 mph in reverse or up to 18.7 mph forward. Between these 5 speeds its torque converter gives you an infinite number of gear ratios for smooth acceleration, and permits instant gear shifting wthout risk of shock load on the power train.

Your operator can choose the most efficient speed for any condition, steer with his fingertips when in mud, snow or soft ground, work with the certainty of an always balanced machine and the sure traction of front driving wheels always located at the fulcrum of the load.

Have your Jaeger distributor show you a Load-Plus at work — or ask us for Catalog L100-3.

Load increases traction because it's centered on the driven front wheels. Hoisting crowds bucket 13″ deeper into pile.



8′2″ dumping clearance with 24″ reach, in only 4½ seconds from "carry" position. Finger-tip hydraulic controls.

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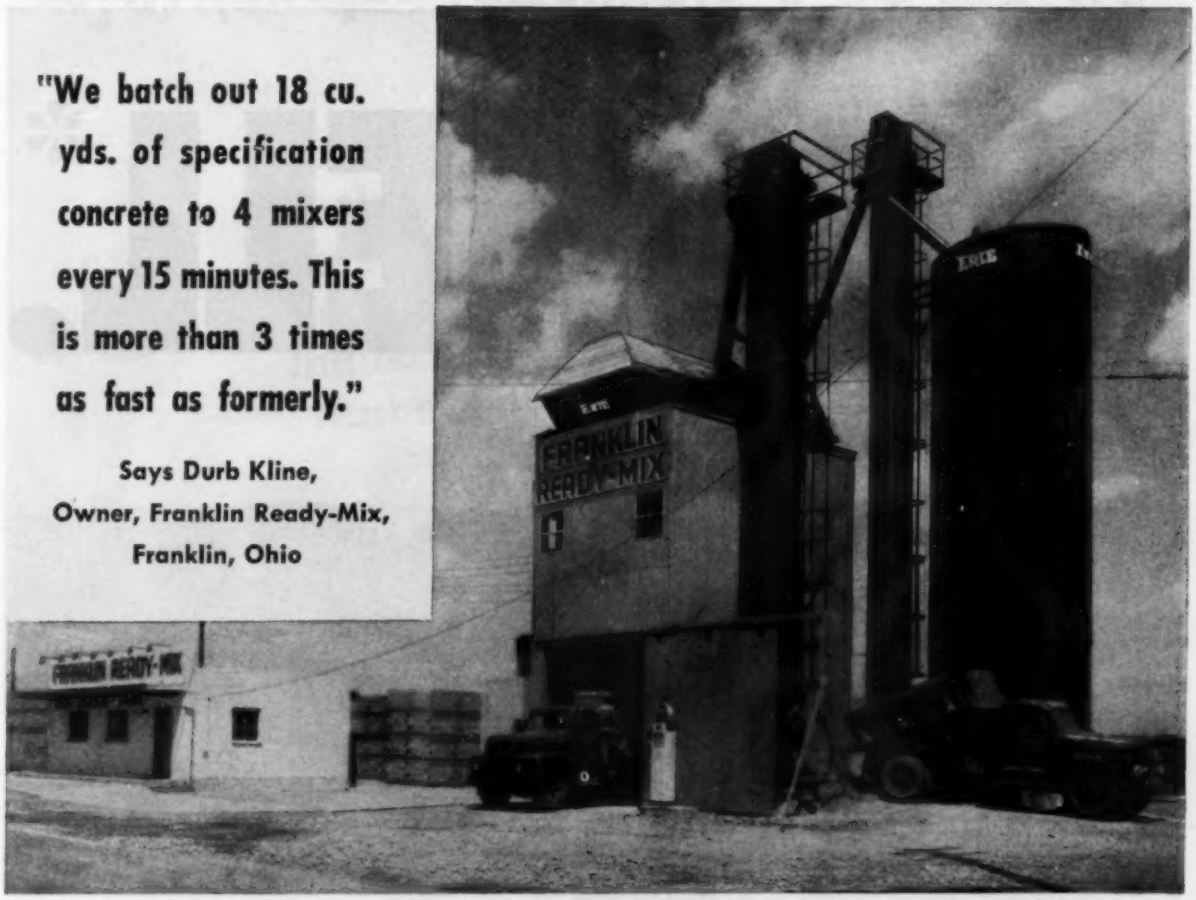
WITH ERIE STRAYER BATCHING EQUIPMENT FRANKLIN READY-MIX TRIPLES PRODUCTION

"We batch out 18 cu. yds. of specification concrete to 4 mixers every 15 minutes. This is more than 3 times as fast as formerly."

Says Durb Kline, Owner, Franklin Ready-Mix, Franklin, Ohio



Franklin Ready-Mix's Erie Portable Truck Mixer Plant, Type GTES-79 With 853 Bbl. Ground Silo. Sold by Bode-Finn, Dayton, Ohio.

They're asking you politely to cut your profit when they say, "Sharpen your pencil." Profit is the smallest part of your income. How much of it can you cut and stay in business? And even if you did, it wouldn't be enough —today's competition is way beyond that. You must reduce costs.

Erie Strayer Equipment knocks costs down to rock bottom—without touching profits. If anything, you'll increase them. From design to finished product, there's only one idea in mind at Erie Strayer: To build equipment that will make accurately batched concrete fast and at low cost. Franklin Ready-Mix is a typical example of this kind of sound engineering in action.

There's still another advantage with an Erie Strayer set-up. One that's just as important as operational savings. Every unit is a custom-built package made from standard, production parts. This means complete flexibility. And standard parts mean replacements in a hurry when you need them.

You and an Erie spread will make a winning team. Find out about it now.

More Facts About Erie's GTES-79 Portable Truck Mixing Plant

- **One man can operate this unit at full capacity.**
- **Pre-assembled sections make set-up and take-down fast and easy. Stows compactly for over-the-road transit.**

Write for Bulletin GS, Dept. Q 114

FORMERLY ERIE STEEL CONSTRUCTION COMPANY

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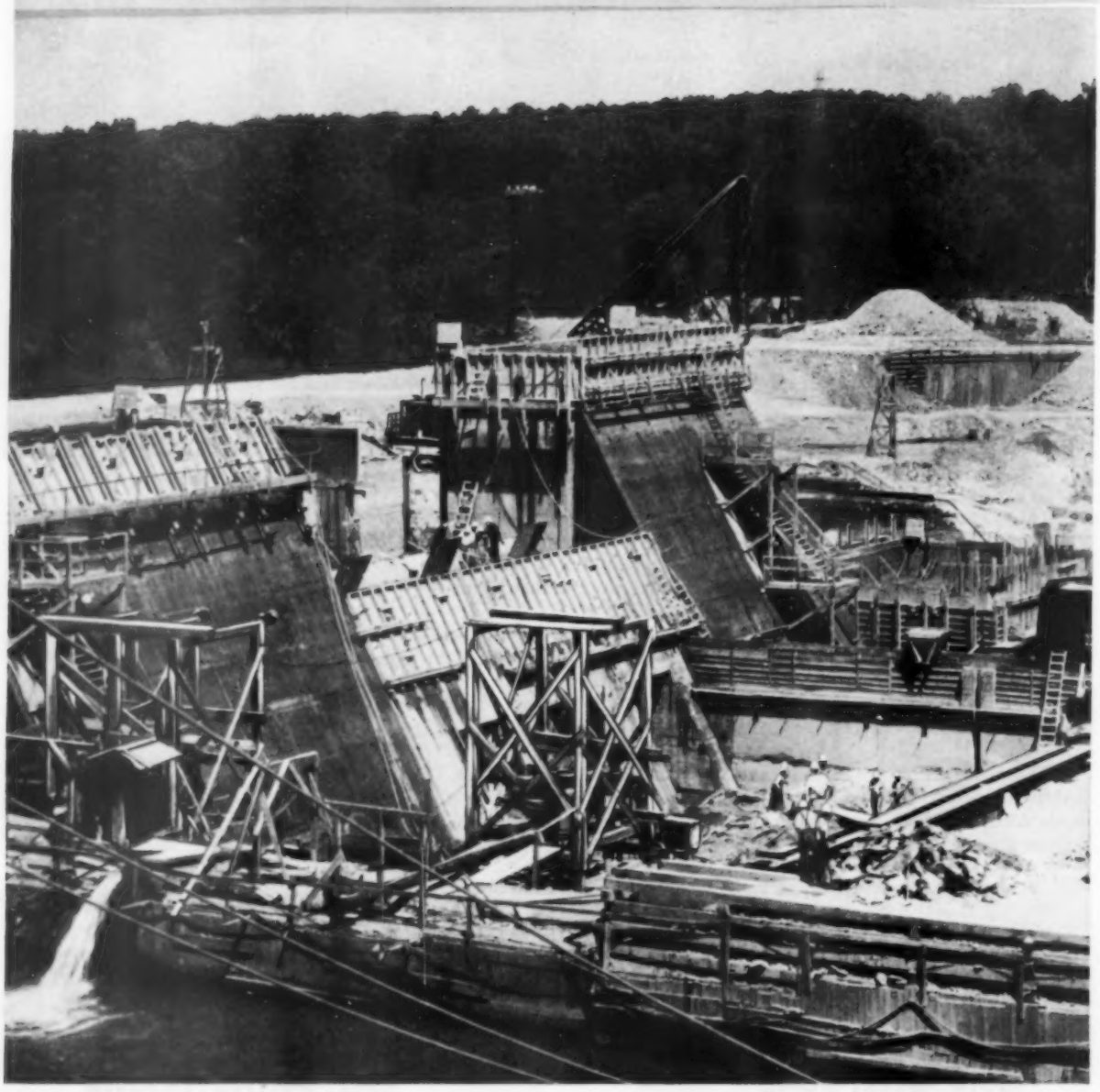
SAME PEOPLE • SAME PRODUCTS • JUST A NEW NAME

3114 GEIST ROAD ERIE, PENNSYLVANIA

On VEPCO'S Roanoke Rapids, N. C.

it's SHELL.*



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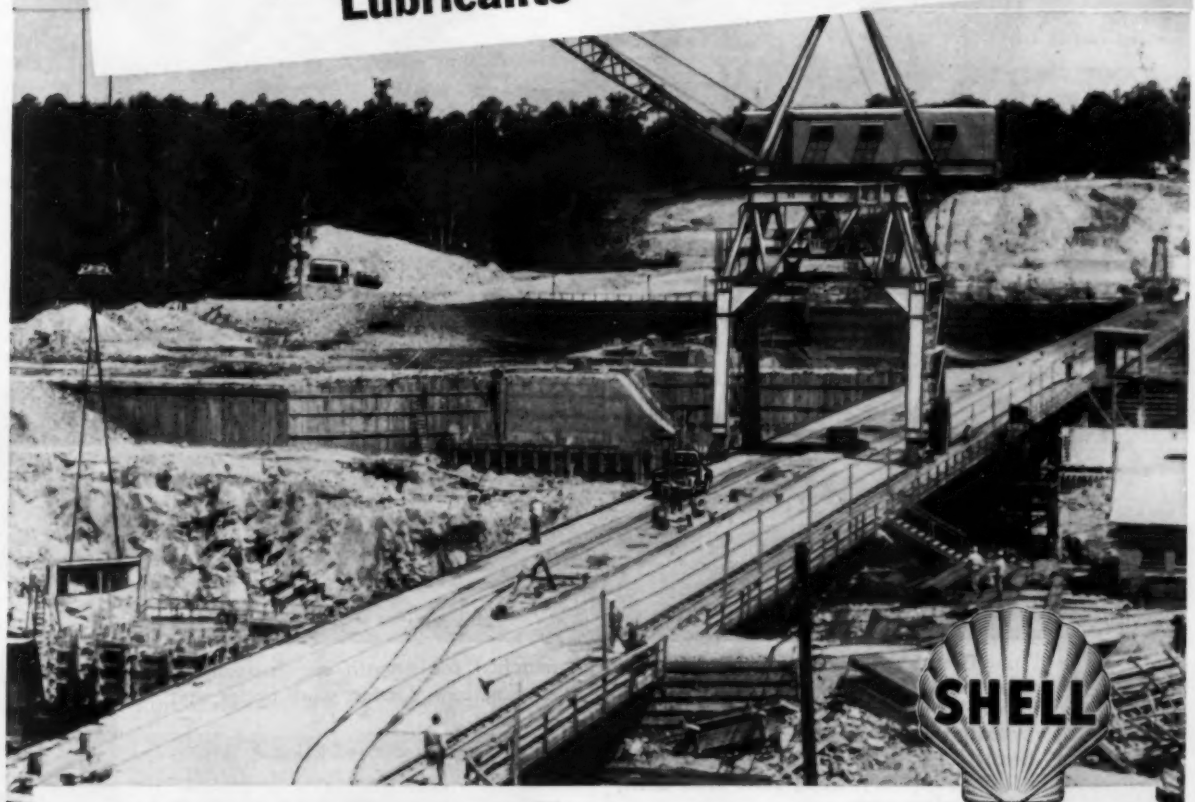

The Roanoke Rapids Project for the Virginia Electric and Power Company, being constructed by Stone & Webster Engineering Corporation, is going full speed ahead. This extensive job keeps hundreds of pieces of heavy construction equipment busy, day and night. Nearly 100% of this equipment relies on Shell Industrial Lubricants and Fuels to meet the rigorous operating conditions.

When completed, Roanoke Rapids project will supply 100,000 kilowatts of electricity for Vepco's system.

Widely used in construction work and wherever heavy duty equipment operates, Shell lubricants protect machinery and at the same time keep maintenance costs at rock bottom. Perhaps it will pay *you* to look into the savings of a 100% Shell program.

SHELL OIL COMPANY

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100 BUSH STREET, SAN FRANCISCO 6, CALIF.

*A diligent search could uncover only one piece of Vepco's equipment NOT using a Shell product.

More Bucyrus-Eries are Used for Output in ROCK than Any Other Make of Excavator . . .

There's a reason why you'll find more Bucyrus-Erie excavators on rock work than any other make! Featuring Individual Design for each model in the line, they're built to take the beating of quarry work shift after shift, year after year.

Individual Design assures a perfect match of the machine to its rated load. Front end, main machinery, power unit, and mounting are all perfectly matched for smooth coordination of all functions, for fast work cycles, and for long life.

Investigate the additional advantages of Bucyrus-Erie *individual design* — see what they can mean to you in terms of higher overall output, lower overall costs. Get the facts from your nearby Bucyrus-Erie excavator distributor. 26E54

3/8- to 4-yd. Gasoline, Diesel, Single Motor Electric Excavators

SOUTH MILWAUKEE **BUCYRUS ERIE** WISCONSIN

Robot Cement Ships

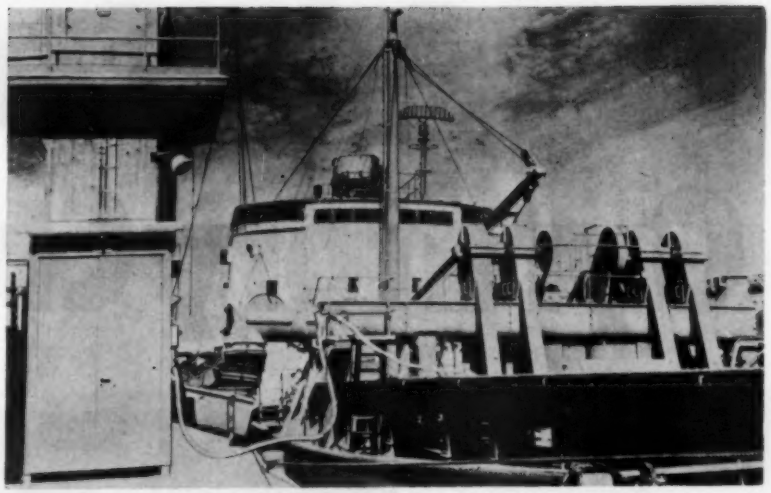
(*From page* 120)

The ship then could load bulk cement at any of Skanska Cement's plants and afterwards discharge bagged cement in any port, or even into other ships at sea. The result was a 70 percent saving in labor over conventional loading and discharging of bagged cement. (Compare this to the 98 percent saving made by purely bulk-discharging craft. Since the figures are for loading and discharging only, they do not indicate the actual saving in eliminating the on-shore bagging operation.)

An important component of the on-board bagging system is that the ship is equipped with an automatic discharging system for the bagged product. For example, the company's first bagging-plant ship once discharged with only five stevedores, when no more were available. For a conventional ship of the same size, discharging bagged cement would have required three gangs of 13 men each, or a total work force of 39 men.

After only two years, however, it appeared that there was no difficulty in utilizing the reserve ship, and in view of (1) increased cement consumption in Sweden, (2) the growing shortage of stevedores at Slite, one of its biggest plants, and in ports along the Gulf of Bothnia, and (3) the lack of convenient ships, it was decided to rebuild another cement carrier, the *Ostanvik*, which became the firm's most modern carrier.

There was a question as to whether it was not cheaper to build a new ship, but the time element was the deciding factor, since it would take three years to build a new ship and only one year to rebuild the old one. Furthermore, the ship would be laid up only six months of this year since the first half year would be devoted to building the equipment.



The cross-ship worm-screw on the "Vika I" discharges bulk cement directly into a shoreside receiving station. (The "Ostanvik" has the same arrangement.) The screw can also deliver to the ship's bagging plant. For loading, this screw carries cement to four lengthwise worm screws for more even distribution in the holds.

Ostanvik was a comparatively new ship at the time it went into the yards for rebuilding on December 10, 1951, having been delivered from Lindholmen Shipyards at the end of 1949. She had spent a year in the Orient and afterwards carried coal and cement in Skanska Cement's service. After rebuilding she carried a load of 1,732 tons in Baltic traffic and 1,891 tons in Archipelago traffic. Her 1,200-i.hp. diesel gives her a speed of 13 knots. The crew of 24 men includes an electrician to maintain the loading system and a bagging machine operator.

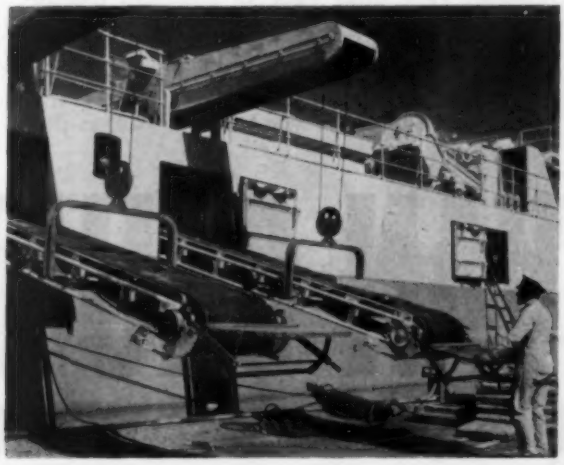
Two cement silos, which allow the transport of two grades of cement, have been built into the *Ostanvik's* largest cargo hold. The silo floors have been equipped with chain conveyors for discharging. These conveyors take the bulk cement to elevators, which in turn deliver it to a cross-ship worm-screw above deck. This worm-screw can deliver the cement either to bulk-receiving equipment on the dock, or to the bagging plant on board.

The bagging plant consists of two machines, each with a capacity of 50 tons, or 1,000 bags per hour. (There is a special hold for empty paper bags.) By means of rubber belt conveyors the filled bags can be carried out through either side of the ship directly into railway cars, trucks, fork-trucks, or additional belt conveyors. A special attachment on the *Ostanvik's* bag discharger spaces the bags about 13 ft. apart.

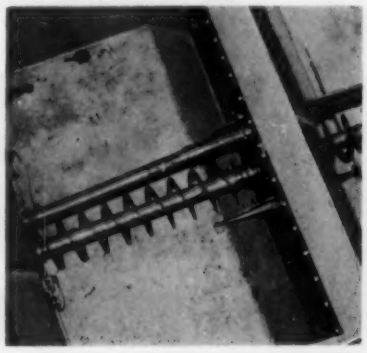
There are two conveyors, which operate separately, in order to allow one truck to pull into place as another finishes its loading, thus preventing slack time in changing trucks. A further advantage of the two conveyors is that if one should be damaged, the other serves as a reserve unit.

The bagging plant is equipped with four-pipe Haver & Boecker machines, which N.L. found superior to and less expensive than the

(*Continued on page* 130)

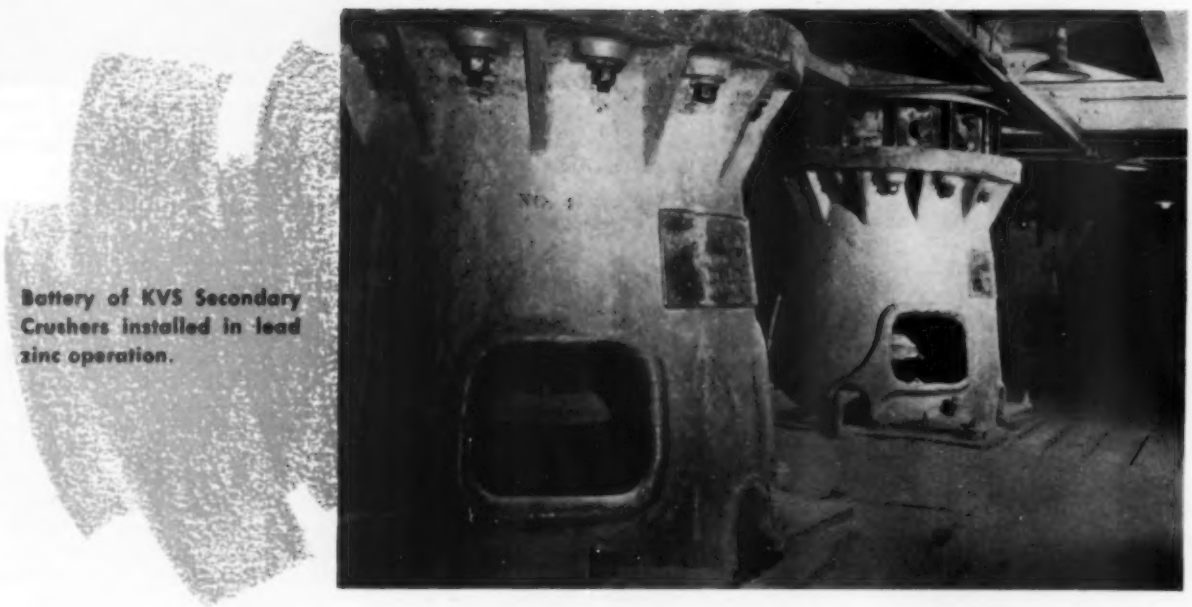


Left: Unloading sacks of cement from the bagging station on the "Ostanvik".



Right: The removable wormscrews which pick up the last cement from the silo floor and move it to the chain trough. They are driven by electric motors controlled at the central instrument panel.

For Any Crushing Gyratory Crushers



Battery of KVS Secondary Crushers installed in lead zinc operation.

No matter what type of rock or ore you crush there is a KVS crusher made to handle the job. Primary and secondary crushers, built to meet *your* exact requirements.

Limestone, Basalt, Taconite . . . . zinc ore, Feldspar . . . *anything* from Phosphates to Slag, crushed to any desired fineness by pre-tested, *engineered* crushers that deliver peak tonnage, year after year at minimum maintenance cost.

KENNEDY-VAN SAUN

Purpose KENNEDY

are first choice the world over!

KVS Primary Crusher reducing lead zinc ore from mine run to 2-⅞".

KVS Gearless Gyratory Crushers are world-famous for economical operation, rugged construction and adaptability—to the crushing of a wide range of products. Our sales-engineering department is available for consultation anywhere on your crushing problems. Over a half-century of know-how is at your disposal.

EXCLUSIVE FEATURES OF THE KVS GEARLESS GYRATORY CRUSHER

- Synchronous motor built into pulley assembly or V Belt drive if desired.
- Smooth, frictionless operation — the crusher is gearless.
- Power used ONLY for crushing.
- All moving parts carried on self-aligning roller bearings.
- KVS forced-feed oiling system pumps four barrels or more of oil per hour through bearings without waste.
- Eccentric and ball spray babbitted. NONE has required rebabbitting in over five years.

Manufacturing & Engineering Corporation

TWO PARK AVENUE, NEW YORK 16, N.Y. • FACTORY, DANVILLE, PA.

IT COSTS LESS TO OWN THE BEST!

Robot Cement Ships

(From page 127.)

Swedish makes; they have used these types on both the *Vika II* and the *Ostanvik*.

Besides the cross-ship worm-screw there are four lengthwise screws through which cement can be distributed into the hold during loading. For getting out the last cement from the holds, there are special movable worm-screws.

Loading time for the *Ostanvik* is four hours, which creates the problem of emptying the large ballast tanks in the same time. Discharging of bulk cement is accomplished in eight hours, and bagged cement in 32 hours.

The electrical equipment on board is extensive. There are 60 (a.c.) motors in the system, requiring an electric plant powered by a 250-hp. crude-oil engine. A rectifier permits switching to direct current for the ship's normal use in port, and for this reason the ship's main generators can be shut down in ports. If available, the alternating current can be taken from the dock. All electrical equipment is operated and checked from the central switch- and instrument-panel.

During the time the Gulf of Bothnia ports are frozen over, the *Ostanvik* can make two or three voyages to Gothenburg's or Stockholm's free ports to supply ocean-going ships with export cement, and can also make trips to southern Swedish ports. Most of her service is to Bothnia ports, where conditions make automatic handling highly profitable. The *Vika I*, which has a shallower draft than the *Ostanvik*, supplies some of the smaller Bothnia ports.

The Slite plant has a yearly capacity of 400,000 metric tons (2,200,000 bbl.) of cement, and the Vika plant 340,000 tons (1,870,000 bbl.) since the expansion of both plants in the last two years. These are the main plants served by Skanska Cement's robot ships.

Skanska Cement is better known on the world market through its sales organization, Cementa, which comprises seven Swedish plants, of which Skanska operates five. Total capacity of the Cementa group is nearly 2,000,000 tons (11,000,000 bbl.) a year (portland), plus some low-heat cement. The group exports to some 30 countries. A total of 342,547 tons (1,700,000 bbl.) was exported in 1953. Nearly all of the export brand comes from Slite and Limhamn (also a Skanska plant) because of their good port facilities.

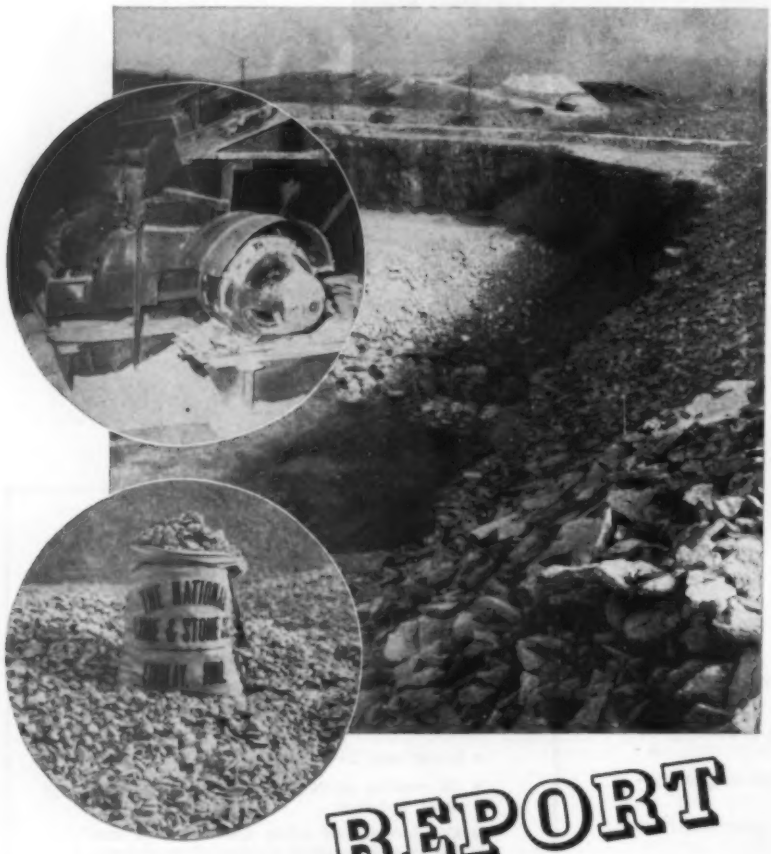
The bulk cement ships, of course, are used only in domestic traffic, serving a market having one of the highest cement consumer ratios in the world. In 1953 consumption reached 276 kilos (607 lb.) per capita.

North American Cement Co. Acquires New Shale Deposits

Exhaustion of clay deposits at the North American Cement Corporation's Howes Cave (N.Y.) plant has necessitated the purchase of three tracts in the vicinity of Warnerville, N.Y.

Excavating equipment was moved to the newly acquired deposits of shale, and the material is being shipped *via* a spur of the Delaware and Hudson Railroad to the Howes Cave operation, a distance of about eight miles.

Reuben S. Billings, president of the Mineral Mining Company, of Cody, Wyo., announced that at a recent meeting of the firm's board it was decided to open the bentonite mine at Cody for mining and milling.



REPORT

"NO DOWNTIME IN 4 YEARS"

It's that kind of record that makes Eagle equipment a favorite in the limestone field. In addition to the faithful 24 x 24 hammermill pictured above, there is installed in this quarry an Eagle 36 x 42 which takes the rock from the gyratory crusher and reduces it for the smaller mill.

Please write for more details if you're interested.

EAGLE CRUSHER CO., Inc. GALION OHIO·U·S·A

JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

POWER. In this leaflet *Wisconsin Motor Corp.* gives power curves, specifications, special features, and other pertinent information on their complete line of 1-, 2-, and 4-cylinder, 4-cycle engines. (1)

MORE PAY LOAD. By designing their hoists and bodies to place more weight on the front axle, the *Anthony Co.* enables users of their equipment to get up to 1000 lb. additional pay load. (2)

VIBRATOR. This *Vibrator* provides a rapid vertical circular motion for material to be tested on sieves. Compact and rugged the device is built to give long, efficient service. (3)

ROTATING EQUIPMENT. A profusely illustrated bulletin from the *Eaton Mfr. Co.* graphically shows their line of drives, couplings, brakes, and other adjustable-speed equipment. (4)

ELECTRICITY. All manners of electrical construction are in the domain of the *Kelso-Burnett Electric Co.* This booklet gives some examples of the comprehensive and extensive installations they have handled. (5)

NO BELT SLIPPAGE. Simply by dripping some *Beltraction* on your power transmission belts will give protection to your belts and provide better alignment of tools by reduction of slippage. (6)

BETTER FILTERING. The *Dorfan Impingo Filter* for cleaning hot, wet, and corrosive gases and air is fully described in this illustrated bulletin. (7)

RUGGED TRUCK. It takes a brute of a truck to handle construction hauling and *Autocar* is the outfit that builds just such equipment. This brochure shows a few of their many applications in our field. (8)

RUBBER FACTS. *Neoprene Notebook* is a publication which gives some helpful, interesting facts on rubber abrasion, flex fatigue and tearing. (9)

SPECIFIC LINING. In a clearly worded catalog the *A. P. Green Fire Brick Co.* shows the correct application of their varied line of refractory products in the cement and lime industries. (10)

STOP RUST. *Rust-Oleum's* new 20-pg. catalog list their outstanding rust preventitives and also gives many ideas on surface preparation and application, correct color suggestions, and the new roller that coats one side of a wire fence and 70 percent of the other. (11)

LIGHT BUCKET. Literature describing the new *Page* lightweight dragline bucket tells of its efficiency and durability. (12)

COUPLING. A 20-pg. catalog is now available from *Lovejoy Flexible Coupling Co.* which describes their complete line of coupling devices. (13)

TRUCK CRANE. A "picture-book" showing on-the-job views of the 6-ton *Lorain* TL-10 truck crane stresses its new light weight and easy mounting but ruggedness. (14)

REFRACTORIES. Graphic flow charts, photos, and semi-technical text explain the basic refractories processing facilities of *Kaiser Aluminum* in this booklet. (15)

MOTOR CONTROL. This two-color publication uses photos, charts, and diagrams to explain the Limitamp co-ordinated control system manufactured by *General Electric.* (16)

TRUCK SHOVEL. *Schield Bantam Co.* offers two new bulletins giving shovel specifications, capacities, and optional equipment for their ⅜ yd. truck-mounted Bantam or their ½ yd. crawler-mounted shovel crane. (17)

INSTALL IT YOURSELF. *Spiratube* installation is so simple that you can do it yourself and save both time and money. Like *Flexflyte,* its smaller counterpart, it works efficiently both blowing and exhausting, bends at any point, is light and easy to carry, and retracts for easy storage. (18)

RECOMMENDED. This folder recommends the proper lubricants to use to get the most out of your *Fuller* transmissions. (19)

REPLACEMENT CHAINS. This *Kensington Steel Co.* catalog lists replacement chains for many types of plants and also contains groups of renewable tooth sprockets, crusher parts, and crawler treads. (20)

RUBBER DATA. A compact guide to weight , tensile, and hardness of *Hamilton Rubber* sheet stocks is offered. (21)

PUMPS. *Worthington Corp.* describes the attributes of their new 2-stage centrifugal pumps designed for working pressures up to 400 psi and capacities up to 1300 gpm in this graphically illustrated bulletin. (22)

QUICK AND EASY. The *Baughman* 220 inclined elevator continuous bucket belt makes high-capacity handling of heavy materials a snap according to this leaflet. (23)

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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80															

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City_____ Zone_____ State_____

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

TANDEMS. Complete data on several of *Truck Engineering Corp.* new heavy-duty semi-trailer tandem axle dump units is listed in this publication. (24)

QUICK AS A FLASH. *Dodge* taper-lock sprockets are always ready to install—no reboring, keyseating or drilling is needed. This brochure lists all of their sprockets and roller chains as well. (25)

COMPLETE SYSTEMS. The new *Davenport* bulletin covers their screen, pressing, and dryness systems. In it are given the stories on their various set-ups by explaining step-by-step the application of the various units. (26)

SAND PUMPS. Frothy, abrasive pulps are handled without difficulty by *Denver's* vertical centrifugal sand pump. What's more these concentrates can be handled without extra spray water which often eliminates the need for thickener ahead of filter. (27)

CUT COSTS. These *Hobart* arc welding electrodes cut production time and lower costs in their vital applications in quarry operations. (28)

RADIO UNITS. Ten new bulletins are offered by *General Electric* covering their complete line of radio communication equipment which includes six base and four mobile station combinations. (29)

SAFETY FIRST. This booklet tells of *Martindale's* protective eyeshields and masks—the safety equipment that workers enjoy wearing. (30)

LEVEL CONTROL. A colorful leaflet describes the *Fielden* Tektor electronic level control which is claimed to be perfect for granular and bulky solids. (31)

NO MORE OVERLOAD. *Morse* torque limiters are compact, adjustable slip-clutch devices that provide automatic over-load protection for machinery drives thus assuring longer life for all associated parts. (32)

TRANSMISSION BELTS. A fully-illustrated bulletin featuring flat transmission belts and their applications is offered by *Quaker Rubber Corp.* (33)

FAST LIFT. All the safety features, performance figures, and construction details are clearly given in this leaflet on *Coffing's* new Quick-Lift electric hoists. (34)

CHAIN OILING. This pamphlet explains the new chain oiling system developed by the *Oil-Rite Corp.* (35)

WET CYCLONES. Valuable performance data covering numerous installations are contained in this new *Equipment Engineers* booklet. One example shows a 10.3 tph recovery of fine, clean sand (for blacktop use) from overflow to waste of a conventional sand classifier. (36)

EASY APPLICATIONS. Sketches amply illustrate this catalog sheet of *Speco's* Rustrem, an anti-rust paint which can be applied with a minimum of surface preparation and no priming. (37)

NEW PUMP. *Gorman-Rupp Co.* claims in this new folder that their new diaphragm pump will give as much as 400% more pumping at 25 ft. static lift and that diaphragm life is increased 10 times. (38)

IRON TERMS. A glossary of terms for users of iron castings which defines and explains over 150 technical terms is offered by *International Nickel.* (39)

READILY CONVERTIBLE. The new *Harnischfeger Corp.* bulletin stresses the versatility and power of their new "Miti-Mite" truck crane. (40)

CHAIN DATA. All the data on chain specifications and working load limits for *Taylor Made* chains are included in this leaflet. (41)

HEAVY DUTY. This *Atsco* bulldozer is built to take full power of the tractor and features a simply operated trunion adjustment for tilting dozer bowl and easy accessibility of pump, tank and valve. (42)

SAVES SPACE. German-made, this *Standard* cylindrical filter effectively combines a centrifugal filter with a tube filter of 3 to 6 chambers and saves much space in the bargain. (43)

LONGER LIFE. Profusely illustrated in color, *U.S. Motors* points out in this booklet the reasons their normalized castings lengthen the life of their electric motors. (44)

LOWER INSURANCE COSTS. Fewer claims due to deafness are the result of proper audiometric testing according to the *Industrial Acoustics Co., Inc.* (45)

STURDY BODIES. *Galion's* all-steel dump bodies have payload capacities of 5-9 tons and are sturdily built for long wear. (46)

RUGGED DIGGER. To illustrate the ease of operation and ruggedness of their diggers, *Sauerman Bros.* tells how one of their scrapers dug from an especially difficult hill. (47)

NOVEMBER 1954

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Only your Caterpillar Dealer offers "BONDED BUY" in used machines to do more work at less cost

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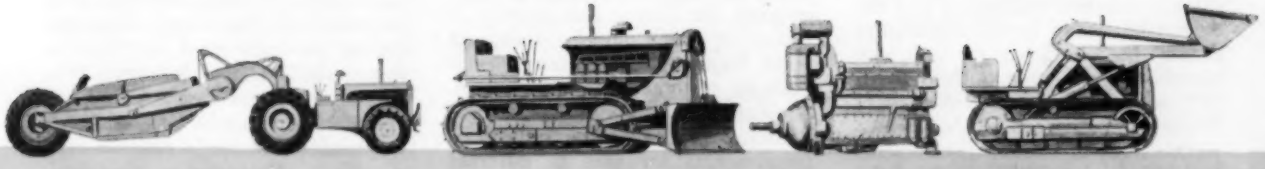

You know what you're getting when you buy used heavy-duty equipment from your Caterpillar Dealer. Only your Caterpillar Dealer gives you a selection of machines in three clear-cut classes for all phases of mine and quarry work: stripping, haul road construction and maintenance, pioneering, materials handling, compressor and jumbo drill work, etc.

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DON'T GUESS OR GAMBLE—
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(1) "BONDED BUY." Only the best in used Caterpillar-built equipment. Each "BONDED BUY" machine is backed by a Dealer's Guarantee Bond equal to the purchase price of the machine up to a maximum of $10,000. This provides a guarantee for thirty days against unsatisfactory performance due to defective parts. If a part should prove defective within the guarantee period under the normal conditions of your job and with proper maintenance, your dealer will put your machine back into operating condition *with no charge to you for parts and labor* up to the amount of the bond. The Dealer's Guarantee Bond is backed by The Travelers Indemnity Company. Your Caterpillar Dealer gives you this protection, at no cost to you, with your purchase of a "BONDED BUY" machine. Look for the "BONDED BUY" symbol —your assurance of the best in used equipment.

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

Merchandisable Sand and Gravel—

*their requirements, known and under investigation**

By STANTON WALKER
Director of Engineering
National Sand and Gravel Association

INTRODUCTION

WHAT makes sand and gravel from a given deposit merchandisable? That depends, of course, on several factors obvious to all of you—its economic availability to the market and its ability to meet specification requirements. And there is something of a circle here! To some extent, although certainly not entirely, minimum specification requirements depend on the characteristics of the readily available materials and also determine their economic availability. The answer to the question of what constitutes economic availability and the degree to which ready availability should be permitted to influence minimum specification limits is worth at least $64. It can be answered only in the light of a thorough and objective study of market requirements and of materials within reach of the market.

If I can make any contribution to the answer, it is by saying something about specification limits and their significance and what may be considered as minimum limits. That, in itself, is a very large order. Some of what I have to say will sound like an old record, but I do not see how I can avoid repeating some of the things I have said over the years. I shall endeavor not to belabor the obvious. No attempt is made here to present you with a reference work on specifications and uses for sand and gravel. I shall touch only on the high points.

*Presented at the 38th Annual Convention of the National Sand and Gravel Association, Chicago, Ill., February 19, 1954.

PRINCIPAL USES

Specifications depend on end use. Primarily, I believe our industry thinks in terms of producing for concrete. Available statistics do not show how much is used in this category, but I am sure it must be well over one-half the commercial production. As you know, specification requirements for concrete dictate, in large measure, the nature and amount of processing which must be done, and State Highway Department Specifications generally set the pattern. However, to an increasing degree, standardization is leading to the same requirements for uses in different fields.

So-called building sands, those for masonry and plaster, represent an important market, particularly masonry. In an endeavor to correct some of the obvious ills of masonry construction, and of plaster, some quite rigid specifications have been drawn, but it is doubtful if they have been widely applied. We will talk more about that later.

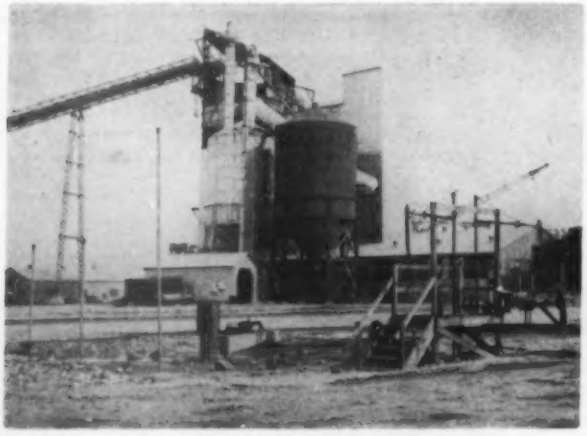
Railroad ballast continues to represent an attractive market for many producers, but it has played a decreasingly important role in recent years so far as volume is concerned. I have strong reason to believe that, to some degree at least, this represents decreasing sales pressure on the part of the sand and gravel producer, because of more attractive markets, rather than decreasing willingness on the part of the railroads to use gravel. Gravel makes excellent railroad ballast when suitably graded and prepared.

Bituminous mixtures present an increasing market. It is one in which, for the most part, the industry has directed its attention to the so-called lower types of construction. We should pay more attention to the higher types and these, together with increases in current bituminous mixture markets, represent a tremendous potential use. The average sand and gravel producer does not feel at home talking about bituminous mixtures to the extent that he does about concrete. He should become better acquainted with the bituminous field.

MISCELLANEOUS USES

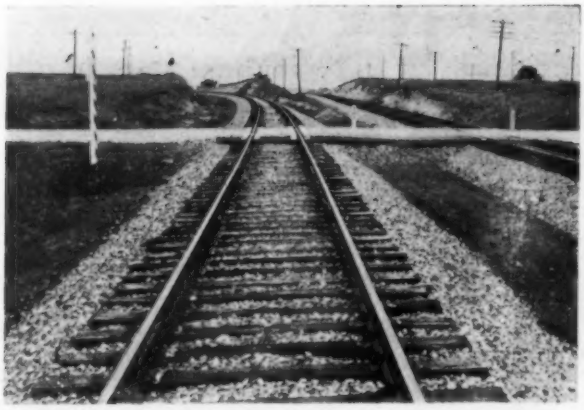
There are a large number of miscellaneous uses. Several of our members have developed specialty products profitably, but on the whole, they aim at large volume use. Nevertheless, the distant fields of special use frequently look greener, and a considerable volume of my correspondence has to do with it.

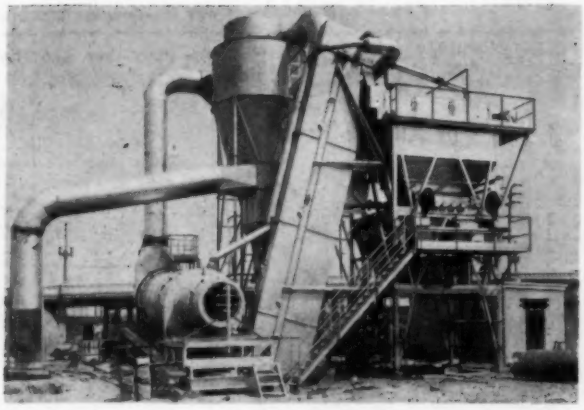
For the most part, requirements for the specialty materials are so rigid and so specialized that the average sand and gravel producer is not in a position to produce them. Further, the whole problem of handling and marketing these materials in relatively small volumes is foreign to



A large portable ready-mixed concrete plant setup.

A typical modern ready-mixed concrete operation.





Left: An example of railroad ballasting. Right: A modern hot mix asphalt plant.

the background of training of the marketer of construction materials. Also, chemical requirements are frequently controlling and if your deposits had met them, you would have known it long ago. On the whole, the industrial sand industry, which has specialized in developing deposits of suitable chemical and mineral characteristics for the specialty uses, handles this market.

Consider glass sand. It is required to be free of significant quantities of impurities and basically it must be pure quartz. Theoretically, I suppose a considerable range in sands high in silica could be used for glass making; but the removal of impurities is a highly specialized process which can be economically applied only in a few cases. The practicalities of the situation require the raw material to have a high SiO_2 content, in the neighborhood of 99 percent or better. This market should be considered only after the most careful study and with sound technical advice.

Foundry sands represent another highly specialized market concerning which I receive many inquiries. The products of most producers of sand and gravel for construction do not meet the requirements for the foundry, although limitations on chemical and mineralogical constituents are much less rigid than for glass sand. Here again, such a market should be considered only after careful study and in the light of sound technical advice.

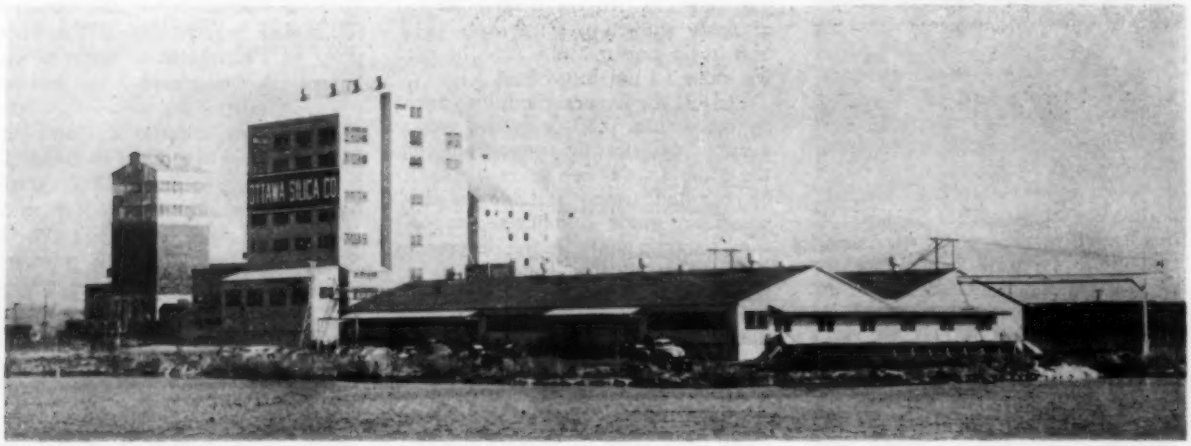
Abrasive sands for grinding and blasting are frequently produced by members of our industry, although the volume is not large and the requirements are frequently such as not to be met readily by production methods generally used in our field. Here the requirements are for a close grading, which you can furnish, and hardness of particle, which depends on the nature of your material and the degree of hardness which can be tolerated, depending upon availability of more abrasive materials. Here again, the market is pretty much for the specialist, although several of our members have supplied it.

And then there are filter sands and gravels. Here we have a logical market, although the continuing demand is not large. Current requirements, as in the case of construction of a new filter plant, may be relatively large; but the continuing demands may not be sufficient to justify maintaining the necessary production processes. I can point to certain sand and gravel producers who have furnished filtering materials in the past and have come to the conclusion that to do so is just too much trouble. Of course, the latter attitude may reflect plentiful markets elsewhere.

A few of our products find a market in the chemical and metallurgical field. So far, as the sand and gravel producer is concerned, the supply is limited almost entirely to quartz and quartzite. The crushed stone producer may, of course, also be interested in chemical and metallurgical limestone . . .

MINIMUM REQUIREMENTS

I have had some difficulty in deciding on an approach to a discussion of requirements. I could go down the line of end uses—portland-cement concrete, railroad ballast, building sands, etc.—and discuss specifications for each. To do that would lead to considerable duplication and to a great deal of detail. Therefore, I propose to discuss characteristics in general terms in two



New plant of the Ottawa Silica Company, Ottawa, Ill.

Table II.—Grading Requirements for Coarse Aggregates.

Size Number	Nominal Size (Sieves with square Openings)	Amounts Finer than Each Laboratory Sieve (Square Openings), percent by weight											
		4 in.	3½ in.	3 in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	⅜ in.	No. 4 (4760-micron)	No. 8 (2380-micron)
1	3½ to 1½ in.	100	90 to 100	...	25 to 60	...	0 to 15	...	0 to 5	...	...	...	...
2	2½ to 1½ in.	...	...	100	90 to 100	35 to 70	0 to 15	...	0 to 5	...	...	...	...
357	2 in. to No. 4	...	...	...	100	95 to 100	...	35 to 70	...	10 to 30	...	0 to 5	...
467	1½ in. to No. 4	...	...	...	...	100	95 to 100	...	35 to 70	...	10 to 30	0 to 5	...
57	1 in. to No. 4	...	...	...	...	...	100	95 to 100	...	25 to 60	...	0 to 10	0 to 5
67	¾ in. to No. 4	...	...	...		...	...	100	90 to 100	...	20 to 55	0 to 10	0 to 5
7	½ in. to No. 4	...	...	...	...	...	...	...	100	90 to 100	40 to 70	0 to 15	0 to 5
3	2 to 1 in.	...	...	...	100	95 to 100	35 to 70	0 to 15	...	0 to 5	...	...	...
4	1½ to ¾ in.	...	...	...	...	100	90 to 100	20 to 55	0 to 15	...	0 to 5	...	...

categories: (1) those which can be altered in production; and (2) those which must be considered in determining whether or not a deposit should be developed.

Gravel Grading From one point of view the discussion of grading first is putting the cart before the horse. It might be said that one should know first whether or not he has materials that are worth grading. However, I am thinking in terms of the established producer with developed deposits or those which he has already decided to develop—and the first consideration always seems to be size and grading.

So far as coarse aggregate is concerned, I believe that the thinking on grading is fairly well stabilized. It is reflected in Simplified Practice sizes, in the development of which the industry played an important part, and also in numerous other specifications such as those of A.S.T.M., A.A.S.H.O. and most State Highway Departments. The practice of using multiple sizes of coarse aggregate, except for the smaller sizes, has become firmly established. In general, where any serious attention is paid to uniformity of concrete, a coarse aggregate of a grading "longer" than No. 4 to 1 in. is not used as a single size. There are some indications of trends to more rigid requirements of No. 4 to ¾ in. representing the "longest" permissive grading, but I doubt if this trend is widespread. I believe that there is fairly general reconciliation to the need for these controls." (The following is quoted from A.S.T.M. *Designation C33-52T.)*

"3. (a) Sieve Analysis—Fine aggregate, except as provided in Paragraph (b), shall be graded within the following limits:

Sieve	Percentage Passing
⅜-in.	100
No. 4 (4760-micron)	95 to 100
No. 8 (2380-micron)	80 to 100
No. 16 (1190-micron)	50 to 85
No. 30 (590-micron)	25 to 60
No. 50 (297-micron)	10 to 30
No. 100 (149-micron)	2 to 10

"(b) The minimum percentages shown above for material passing the No. 50 and No. 100 sieves may be reduced to 5 and 0, respectively, if the aggregate is to be used in air-entrained concrete containing more than 4½ bags of cement per cubic yard, or in non-air-entrained concrete containing more than 5½ bags of cement per cubic yard, or if an approved mineral admixture is used to supply the deficiency in percentages passing these sieves. Air-entrained concrete is here considered to be concrete containing air-entraining cement or an air-entraining agent and having an air content of more than 3 percent.

"(c) The fine aggregate shall have not more than 45 percent retained between any two consecutive sieves of those shown in Paragraph (a), and its fineness modulus shall be not less than 2.3 nor more than 3.1.

"(d) If the fineness modulus varies by more than 0.20 from the value assumed in selecting proportions for the concrete, the fine aggregate shall be rejected unless suitable adjustments are made in concrete proportions to compensate for the difference in grading." (The following is a passage from A.S.T.M. *Designation C144-52T.)*

"3. (a) Aggregate for use in masonry mortar shall be graded within the following limits, depending upon whether natural sand or manufactured sand is to be used:

Sieve Size	Percentage Passing	
	Natural Sand	Manufactured Sand
No. 4 (4760-micron)	100	100
No. 8 (2380-micron)	95 to 100	95 to 100
No. 16 (1190-micron)	60 to 100	60 to 100
No. 30 (590-micron)	35 to 70	35 to 70
No. 50 (297-micron)	15 to 35	20 to 40
No. 100 (149-micron)	2 to 15	10 to 25
No. 200 (74-micron)	...	0 to 10

"(b) The aggregate shall have not more than 50 percent retained between any two consecutive sieves of those listed in Paragraph (a), nor more than 25 percent between the No. 50 and No. 100 sieves.

"(c) If the fineness modulus varies by more than 0.20 from the value assumed in selecting proportions for the mortar, the aggregate shall be rejected unless suitable adjustments are made in proportions to compensate for the change in grading."

Sand Grading Sand grading limitations are undergoing some changes. For concrete sands, you all know of, and have adapted yourselves to, the demand for higher percentages of the finer sizes. As I have had occasion to say before, that demand was derived principally from the use of very lean mixes in dam construction and the like, and from the effort to compensate for other deficiencies in grading common to sands used in such construction—the concentration of too large a proportion of particles within a narrow size bracket so frequently occurring in water-sorted sands. Whatever its origin, it has become firmly established. Customer criticism of gradings of concrete sand will be greatly diminished by producing them with 15 to 20 percent

A belt picker manually removing deleterious material from a primary conveyor belt. Such waste material drops into the bin, which discharges into the truck below.

finer than the No. 50 and enough minus No. 100 to assure that the sand grades down at least that far.

One should examine modern grading specifications for sand closely since, more frequently than not, they say more than appears at first glance. Most of you are well accustomed to the common limitation of uniformity of ± 0.20 in fineness modulus—or sometimes as rigid as ± 0.10. The ± 0.20 is easy of accomplishment. The ± 0.10 causes difficulties, partly because of errors inherent in sampling. I think that ± 0.15 would not be a bad compromise—one which would keep the producer on his toes but yet be practicable of attainment. Such a limitation is not just a fad. It is justified. A change of 0.40 in fineness modulus of sand (the entire range of ± 0.20) would dictate a change in the amount of sand in concrete of as much as 10 percent, which is significant.

There is another limitation with which I suspect you are less familiar than the one just discussed; it is that on concentration of too many particles in a given size range. The A.S.T.M. only recently has inserted such a limitation. It is 45 percent and is fairly liberal, although it will cause trouble in the case of some of the river sands. Something of the order of 35 percent is in the minds of some specification writers. A maximum of around 20 to 25 percent would approach ideal—but would make prodution almost prohibitively costly unless the natural product happened to conform fairly well.

Grading and particle shape of concrete sand are important within limitations of current specifications. They can vary enough to change the water demand of concrete as much as 5 or 6 gallons per cubic yard—a change in water-cement ratio of about one gallon per sack, causing a change in concrete strength of as much as 500 to 1000 p.s.i.

I said earlier that building sands, so-called, have fairly rigid specifications—which, however, are not widely applied. In a recent survey of the A.S.T.M. specification (C 144) for masonry sands, it was found that most of the materials tested, representative of common usage, did not meet the requirements. The evidence that many of these offered entirely satisfactory results was overwhelming. The committee responsible is now studying an "escape clause" which will provide a method for evaluating the performance of sands which do not meet the grading requirements.

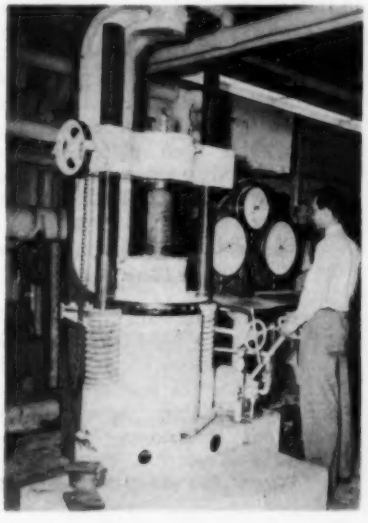
I believe it is general practice for producers to make a single "building sand" which is used in both masonry and plaster. A.S.T.M. specifications for these two uses differ considerably although they overlap enough so that, by exercising fairly rigid control, both can be met by the same sand. As to plaster sand, I should interject the thought that it is a vanishing market—not only because of substitutes for plaster but also because of the encroachment of lightweight aggregates such as perlite and vermiculite.

A.S.T.M. has taken an important step in specifying sands for asphaltic concrete. Grading requirements are no longer stated in the difficult-to-interpret separate percentages between adjacent sieves. They are now stated cumulatively. As a matter of fact, one of the two grades specified overlaps concrete sand so much that the same material can be made to serve both purposes.

I interject here a thought with some hesitancy. The stability of bituminous mixtures depends very greatly on the fine aggregate, and tests have shown angularity of the fine aggregate to have a great influence. Those of you who can produce crushed aggregate may find it advantageous to consider setting aside the screenings from the crushing process for fine aggregate in asphalt mixtures—suitably graded and generally, but not always, blended with natural sand.

Crushed Particles Many specifications for gravel require some percentage of crushed particles. That is the only way that seems to have been devised for specifying angularity—and angularity is necessary for some purposes. It is unfortunate that no more direct and acceptable approach has been developed. After all, angularity is not necessarily a function of crushed particles. Some gravels with high percentage of crushed particles may be less angular than others with none.

If the bituminous field is to be exploited over its entire range, attention must be paid to angularity, however it may be attained. As



Left: Typical concrete disintegration caused by alkali reactivity.

Right: Compression testing in a modern laboratory.

pointed out, under most specifications that means limits on crushed particles ranging all the way from minima of the order of 30 to 40 percent up to 100 percent. Some of them refer to one fractured face and others to two.

These are arbitrary approaches because of the contribution of natural shape to angularity. Fortunately, in bituminous mixtures design the practice is growing of placing limitations on strength as measured by some one of the several methods which have been proposed—none of which has received general acceptance. That should lead to a more logical evaluation of angularity than arbitrary specification limits. If materials will produce the strength required, they should be used. There is still much to be done in this field of research. The strength approach evaluates the fine and coarse aggregate at the same time and recognizes that the needed stability may be contributed to by either or both.

Requirements for crushed particles in gravel for concrete have almost completely disappeared, as they should. In fact, some specifications place a maximum limit on the amount of crushed particles that may be present.

Railroad ballast is in somewhat the same category as bituminous mixtures. It depends for stability, to an important degree, on particle shape. A.R.E.A. specificatioss provide for both uncrushed and crushed gravel, with the grading requirements depending on the amount of crushed. Gravel with no crushed particles is rarely used in heavy traffic tracks.

A ballasting procedure described by H. W. Protzeller before this Association in 1948[1] would make for the broader applicability of uncrushed gravel as well as crushed gravel in railroad tracks. However, that procedure does require departures from standard practice. You will recall that Protzeller proposed a process of "choking" coarsely graded ballast with coarse sand after the coarse material had been placed in the track. Many advantages were claimed for this process, most of which I believe to be valid when economically feasible, which I shall not take the time to discuss here.

Deleterious Particles The term "deleterious" is used to apply to those particles with which so many of you are familiar —soft and friable pieces, ochres, argillaceous sandstones and limestones, shales, "chocolate bars", etc. Here I will say only that limitations on such particles are important. They may be objectionable in a variety of ways from contributing to outright disintegration through spalling and pitting to the point where they are no more than unsightly—doing no harm where an unblemished appearance is not essential. The prevalence of such impurities has resulted, in some localities, in prohibiting gravel, for example, in bridge rails and other work where a pit or a spall would be considered unsightly.

Of more practical importance is the fact that the presence of such particles may have a significant effect on flexural strength of concrete and may limit the attainable strength to a value too low to conform with applicable specifications.

Chemical Reactivity Problems of chemical reactions between certain constituents of aggregates and cements have been so widely discussed in recent years that all of you have heard of them. It is only within a few years that this factor has been recognized in generally applicable specifications. The A.S.T.M. first incorporated reference to it in its Standards in 1952.

That has had an unexpected and unfortunate repercussion in some cases. Requirements that freedom from reactive constituents be proven for any and all uses of aggregates in concrete have cropped up in the general specifications of certain structural engineers. Also, there have been instances of low alkali cements being required even though there was no adequate reason to suspect the aggregates of being reactive. Such requirements are based upon a lack of understanding of the problem. Even if reactive constituents are present, there is no evidence that they cause damage except in environments favorable to the reaction—namely, the presence of moisture.

A principal difficulty lies in the fact that there is no way of determining, quickly and with assurance, whether or not an aggregate, or a combination of an aggregate and a cement, is reactive. I shall not discuss at this time such methods as are available and their reliability or lack of it. . . . However, you should be reminded that the problem exists.

Miscellaneous Characteristics Specifications familiar to you include limits on soundness (Na_2SO_4 or $MgSO_4$ test), on soft particles, on resistance to abrasion, and on a number of other things, most of which do not concern you.

Soundness tests are principally significant for concrete aggregates although they are pertinent to any use where there is exposure to the weather. They may reflect the soundness of the basic parent material, or the losses may result principally from impurities of the nature of soft, friable, and similar particles. The salt tests are quite unsatisfactory in a quantitative sense; but, in the absence of something better, they afford a useful tool. At least, they may serve as a warning that more thorough investigation of the aggregate is indicated.

Aggregates with low soundness losses are not all good, nor are all those with high losses bad. We need better ways for evaluating aggregates. So far as concrete is concerned, freezing and thawing tests of the aggregates in concrete are most informative. However, methods have not reached a stage of standardization to permit of specific limits being written into specifications.

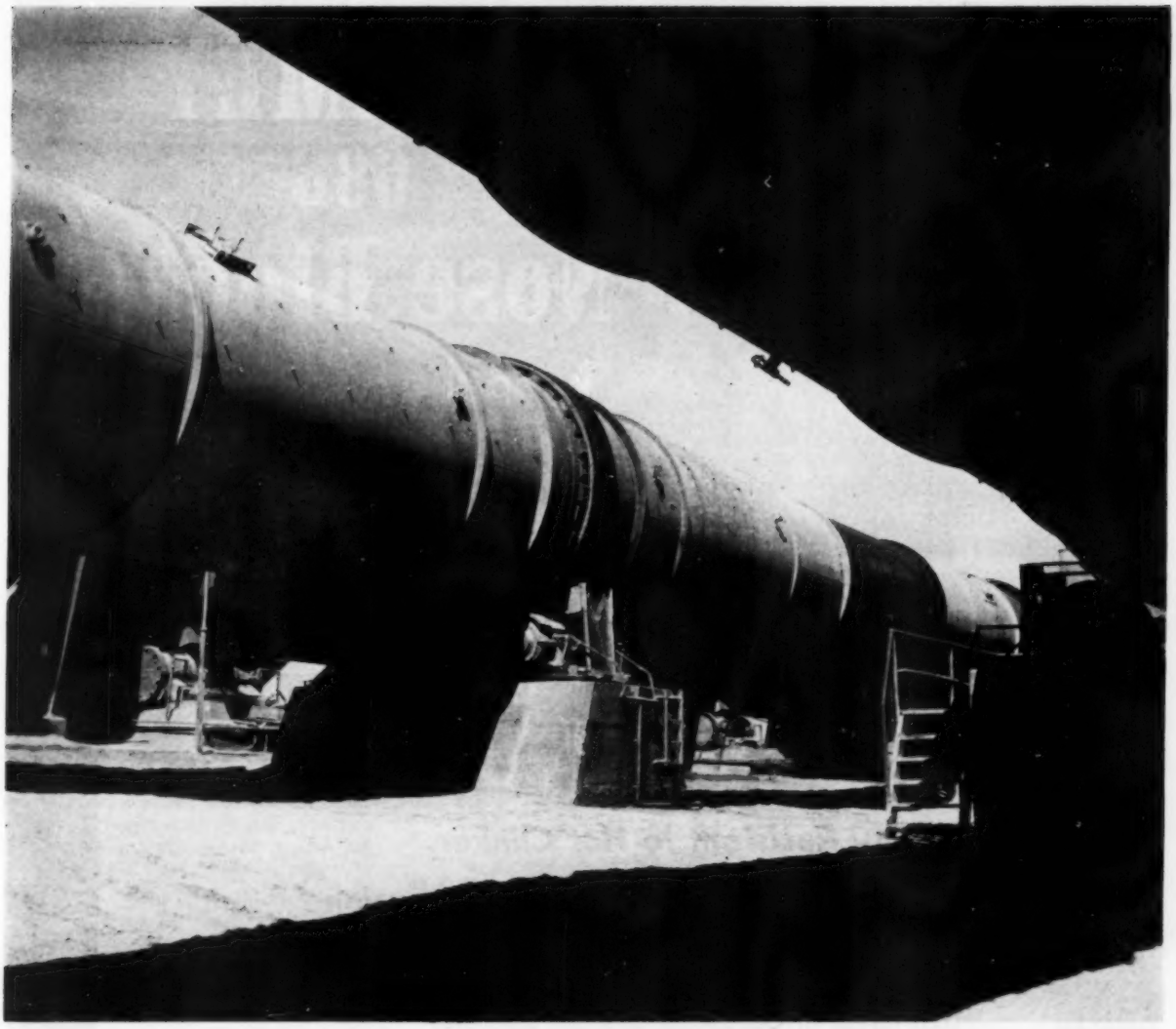
Abrasion tests, again, may reflect the quality of the basic parent material or result from the soft and friable impurities, or, of course, a combination of the two. Certainly, their results bear no close relation to the soundness and durability of the end product. In railroad ballast and in bituminous mixtures, abrasion losses afford some measure of how well the aggregate particles will withstand loads, but materials with very high losses have been used successfully.

In concrete, resistance of aggregates to abrasion is principally significant as it relates to flexural strength, if the problem of soundness and the presence of soft and friable particles has been handled separately. Abrasion loss alone is of no significance to concrete durability. Compressive strength is relatively little affected; but flexural strength may be significantly affected.

Flexural Strength As many of you have had occasion to learn, questions involving flexural strength have become of increasing importance. This measure has been used for many years in the highway field, of course, as one of the criteria of design and as a basis for opening roads to traffic. Recently, however, in airport construction by the Navy and the Air Force, relatively-difficult-to-obtain flexural strengths have been specified—in some cases as high as 700 p.s.i.

(Continued on page 150.)

[1] See PIT AND QUARRY, February, 1948, pp. 79-80.



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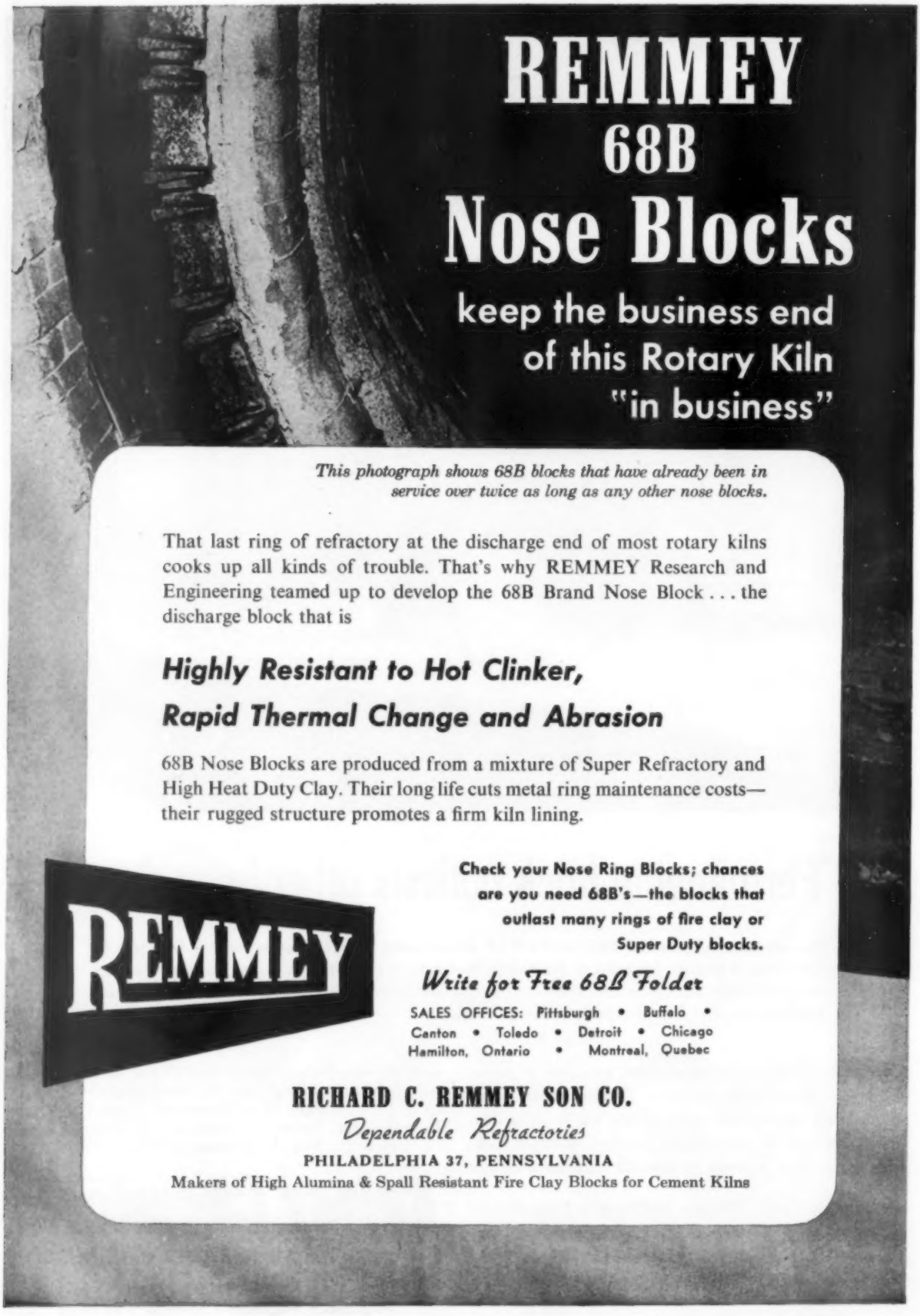

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Report on Current Labor Developments

Opening the Company Books

THE principle has long been established that bargaining in good faith in accordance with the federal labor relations law requires that an employer who rejects a proposal for a wage increase because of inability to pay must disclose the facts upon which his decision rests by producing whatever relevant information he has to indicate whether or not he can afford to agree to the union's request. Accordingly, employers who made no offer to prove their claim of inability to pay or who refused to supply information on the grounds that it was confidential were charged with refusal to bargain in good faith and found in violation of the law.

The difficulty with this general principle was that until recently there were no specific rules for guiding a particular employer faced with this problem. Of course, if he was willing to open his books to the union for its inspection, there was no problem; but for a variety of very legitimate reasons many employers are unwilling to permit union representatives access to these most vital documents.

The basic question faced by employers when pleading inability to pay is, "How much information, short of completely opening the books, am I required to provide?" Regrettably, even now no completely reliable answer can be provided, although recent decisions have established some limitations and set forth the lines of reasoning which are likely to be valid.

A few years ago the National Labor Relations Board agreed that an employer who rejected a wage increase because of inability to pay fulfilled the requirements by offering to open his books to a certified public accountant or a disinterested third party. Presumably, it was not necessary to permit the union representative himself to look at the books.

In a recent case the general principle was narrowed slightly by setting forth two tests for the sufficiency of information furnished in support of an inability to pay claim: (1) the employer must show the basis for his claim; (2) the employer must furnish the union with enough data to enable it to bargain intelligently. These tests, too, are most general.

In applying them to the particular case before them, however, the Labor Board reached these conclusions:

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Industrial and Labor Economists
Washington, D.C. - Philadelphia, Pa.

1. That the employer had met his obligation without opening the company books. It appears that an employer can avoid this kind of disclosure by presenting the information on ability to pay in some other form.

2. That the employer had met his obligation without preparing special financial statements or reports. It appears that if the information provided is sufficiently detailed and complete, no special data not usually prepared in accordance with his regular accounting practice will be required.

3. That the employer had met his obligation even though he refused to give detailed information on the business income from outside investments. It appears that he is required to furnish data only about that part of the business affected by the union's demands.

While the rulings in this case may be useful as guides, they are obviously not the last word on the subject. It must be remembered that each case involving bargaining in good faith is judged in terms of the specific situation in that particular case.

Carpenters-Machinists Jurisdictional Agreement

For many years the question of whether millwrights, members of the United Brotherhood of Carpenters and Joiners of America, or machinists, members of the International Association of Machinists, should have jurisdiction over the handling, erection, and installation of machinery, motors, and equipment has been the cause of bitter strife between these two unions.

Many employers caught in the crossfire between the unions found themselves subject to expensive delays and frequently even gave up their plans to install new machinery. The argument caused the Machinists to withdraw repeatedly from the AFL.

These unions finally settled their differences with an agreement highly reminiscent of King Solomon's decision to "cut the baby in half."

Under this agreement, the Machinists have jurisdiction over the manufacturing and repairing of machinery and equipment; the manufacturing, installing, erecting, and repairing of printing presses and auxiliary printing machinery; and all machine shop work in connection with construction. With respect to the handling, erecting, and installing of brewery and bottling plant equipment, the Machinists have jurisdiction over fillers, crowners, double seamers, and labelers, along with that part of the conveyor which is generally furnished with the machines by the manufacturer and recognized as a direct part of the machine, while the Carpenters have jurisdiction over washers, pasteurizers, packing machinery, and all other conveyor parts.

With respect to the handling, erecting, and installing of other machinery and equipment, the Carpenters have jurisdiction on new construction and additions, while the Machinists have jurisdiction over all the rest.

Where one of the unions is certified or recognized, the other will not interfere.

Where there is no past practice, the Machinists will have jurisdiction.

Where both unions are certified or recognized, the existing division of work will continue.

With respect to the erection of steam, hydro, and gas turbines, the following rules will apply:

1. The work will be performed by a combined crew of an equal number of members of the Machinists and Carpenters unions.

2. The foremen on steam and gas turbines and generators will be members of the Carpenters union; the foremen on hydro installations will be Machinists.

3. The installation of auxiliary equipment will be performed by members of the Carpenters union.

In addition to these rules the agreement set forth a method for peaceful settlement of disputes by final and binding arbitration.

Although the rules appear quite complicated, the agreement is welcome news to employers, who now can plan the installation of equipment with the certainty that men will be available to do the work.

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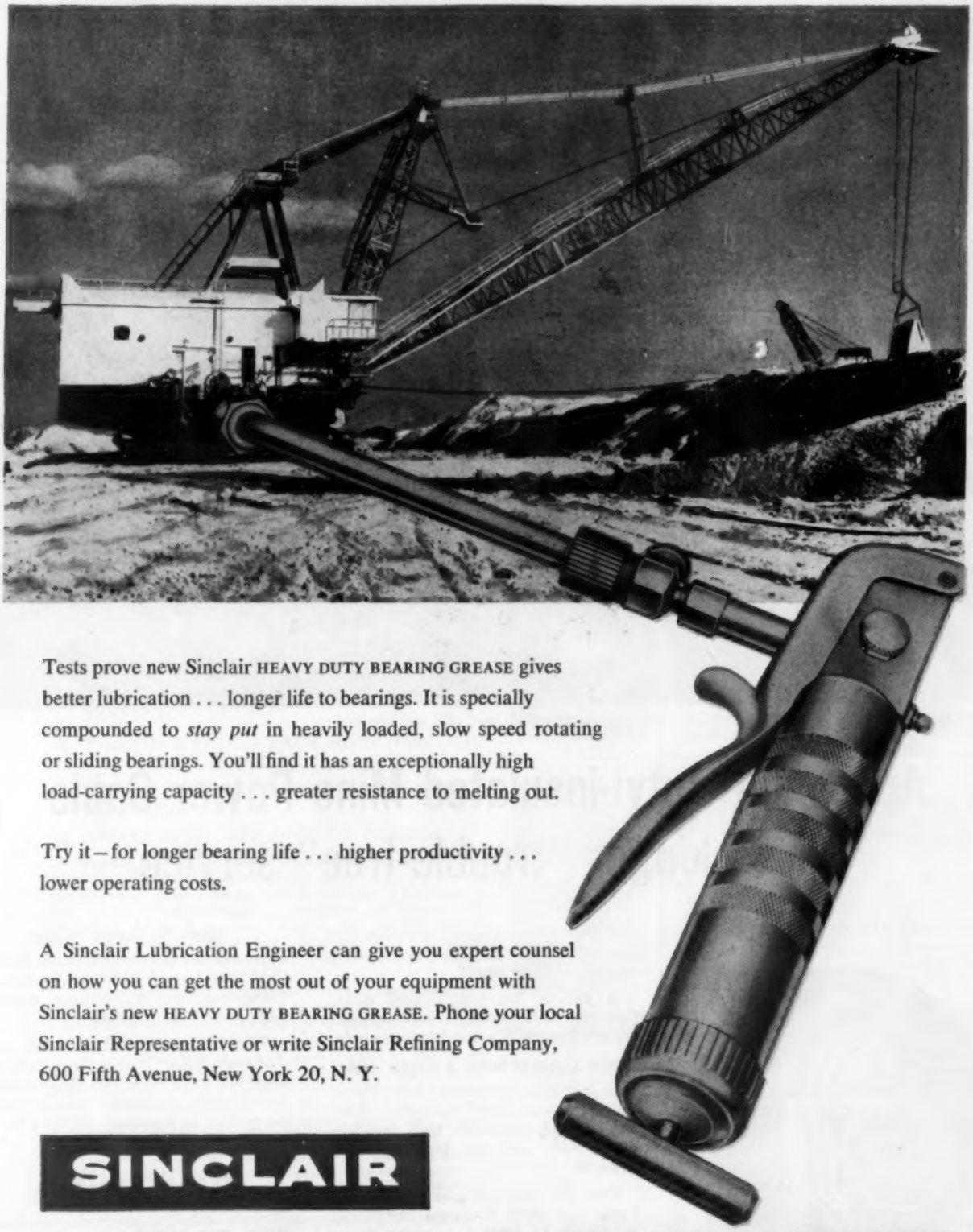

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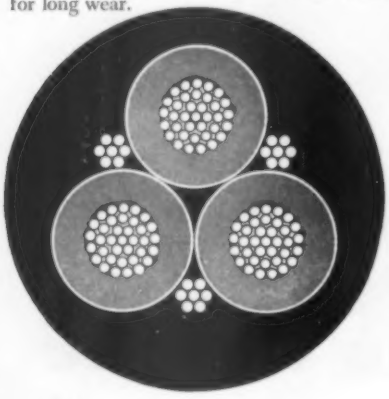

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The Davis PIT-BULL is manufactured by the makers of the Davis Model 100 Loader, America's Quality, Front-End Tractor Loader.

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. . . in the meantime, note the following features of this Philadelphia Double Herringbone Reducer:

Symmetrical arrangement and balance of gears in relation to the centerline of housing (as compared to usual offset method).

First reduction is through double Helical Gears and pinions, and *Final reduction* is through continuous tooth Herringbone Gear and Pinion.

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Husky, spacious housing, well ribbed and properly sized to give an adequate oil reservoir and large radiating surface for thermal capacity.

These are a few of the exclusive and proven features that have made Philadelphia Units a leader in the field for years.

These Units are available in Single, Double and Triple Reductions . . . ratios from 1.75 to 1 in the Single Unit — up to 292 to 1 in the Triple Unit. Be sure to send for 48 page Catalog H-49.

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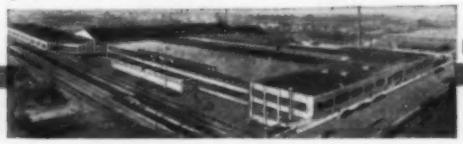

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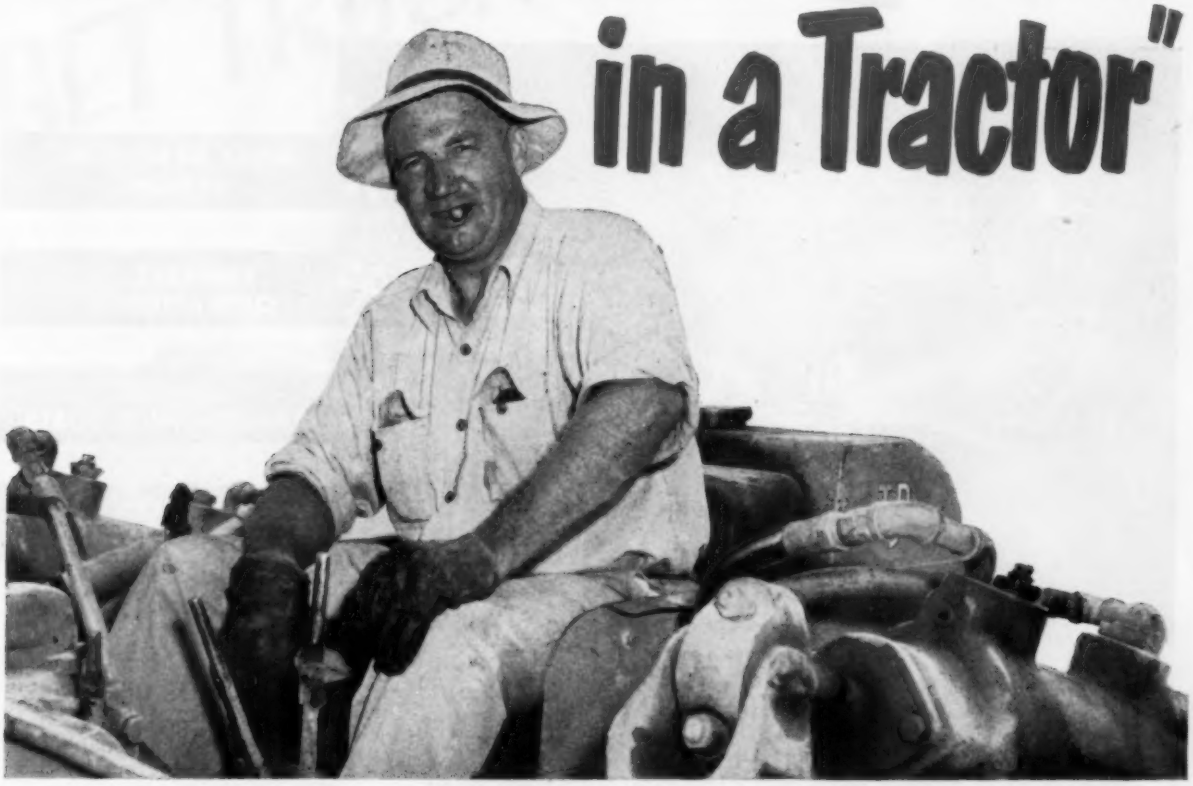


Hard-working International TD-9 scores big in Indiana quarry

The Corydon Stone Company at Lanesville, Indiana, has numerous hurry-up calls for its trouble-shooting TD-9. Dozing crushed stone, pushing chips up on a 40-foot stock pile and cleaning around the crusher are only a few of the tasks it does better and faster.

Operator Steve Bachman says:

"I've operated crawler tractors going on thirty-one years, and I like Internationals better than all the others. The TD-9 really goes to the job in a hurry and gets the job done. That's what a man likes in a tractor!"

Make a date with your local International Industrial Distributor. He'll give you brass-tacks proof of how International power gets out the work. He'll show you fully-equipped repair shops, factory-trained men and full stocks of spare parts. You'll know that his customers are assured of long, profitable service from every piece of equipment he sells.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

PILING UP THE CHIPS. International TD-9 gets all kinds of tidying-up and stock piling jobs done in a hurry, and proves itself a useful quarry hand.

INTERNATIONAL HARVESTER

INTERNATIONAL

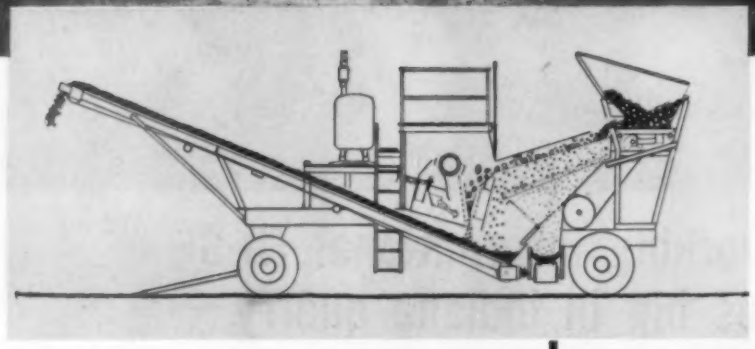
POWER THAT PAYS

Cedarapids Built by IOWA

SINGLE PASS

PORTABLE CRUSHING AND SCREENING PLANT

- MOST PRACTICAL DESIGN
- SIMPLEST OPERATION
- LOWEST MAINTENANCE COSTS
- PRODUCES TWO SIZES



Here's the most practical Single Pass Plant available! Just check these improved features for convenience and economy . . . Hopper and feeder on the rear end let you *back up* to the nearest gravel bank and start producing . . . Simple design with few moving parts cuts maintenance costs. Replacement parts are inexpensive . . . *Two sizes of material can be produced!*

The improved Cedarapids Single Pass Plant pays for itself in money saved on county road maintenance work, small state contracts, base or blanket course jobs and dozens of others. Ask your Cedarapids distributor for details.

HERE'S HOW IT OPERATES

Pit run gravel or rock is fed into the hopper where boulders and oversize rock are scalped off by the grizzly. Material in the hopper is carried by the feeder to vibrating screen for sizing. Fines and sand pass through both screen decks and fall into the side sand delivery conveyor. Material passing through the top deck is chuted to the first delivery conveyor. Oversize off the top deck of the screen passes through the Jaw Crusher and the crushed material is discharged onto the delivery conveyor. This plant features *sand elimination* and also *blending* the desired amount of sand into the finished product by proper position of a flop gate giving a high quality end product. This makes an aggregate that packs and binds satisfactorily. When desired all material can be discharged on the front delivery conveyor by means of flop gate.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Master Bituminous Mixing Plant

Double Impeller Impact Breaker

Motorized Head Pulley

Model G60 6000-lb. Bituminous Mixing Plant

GET TRUCK PAYLOADS!

with the DEMPSTER DIGGSTER® GRD-101

The two photos above show some very important advantages you get when you use a Dempster-Diggster GRD-101. Photo directly above shows you why you have no truck shock with a Dempster-Diggster. You can lay bucket in truck body, trip latch and pull bucket up off load. Photo at right above shows you why you get a truck payload with a Dempster-Diggster . . . and how natural and easy it is to do so. This truck is now loaded to maximum heaped capacity, yet Dempster-Diggster has ample clearance. The dumping height is 9'6" and the digging height is approximately 15 feet. This enables the Dempster-Diggster to work with high dump equipment.

Other very important features of the new Dempster-Diggster GRD-101 include: AN EXCAVATOR THAT NEEDS NO WHEEL TRACTION (loading of bucket is accomplished by the exclusive Hydraulic Crowd and Hoist Action of the Dempster-Diggster) . . . TRUCK-SPEED MOBILITY TO AND FROM JOBS . . . AUTOMATIC BUCKET TRIP . . . MINIMUM TURNING RADIUS . . . THE SHOVEL WITH TORQUE CONVERTER . . . HYDRAULIC STEERING. Here's a shovel that gives you extra speed on the job and to and from jobs that means extra profits to you! Pound for pound, dollar for dollar, the Dempster-Diggster GRD-101 will out-dig and out-load any other available competing machine in tough going! Let us prove that statement! Write for complete information. Manufactured by Dempster Brothers, Inc.

DEMPSTER BROTHERS

2114 N. KNOX, KNOXVILLE 17, TENNESSEE

Merchandisable Sand

From page 138.)

Flexural strength is substantially affected not only by the strength of the mortar but, since failure is in tension, also by the tensile strength of the coarse aggregate particles and by the bond between the coarse aggregate particles and the mortar. Failure in flexure may be visualized as originating from one of three sources—the mortar, the bond between mortar and coarse aggregate, and the strength of the coarse aggregate itself. Thus, the relationship between water-cement ratio and strength, which is so helpful in proportioning concrete for compressive strength, is less definitive in its application to flexural strength. Depending on where the "weak link" is, an increase in cement factor may not always produce a proportionate increase in flexural strength.

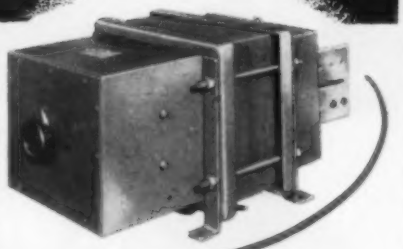
CLOSURE

As I stated at the outset, this paper is not intended, in any sense, as a source of detailed information concerning aggregate uses or specifications. To have made it so would have been to make it so voluminous as not to be feasible of oral presentation. I have endeavored only to call your attention to some of the principal factors which require your attention. The detailed information needed to take all of them into account is available elsewhere. . . .

LET THE RECORDS SPEAK!

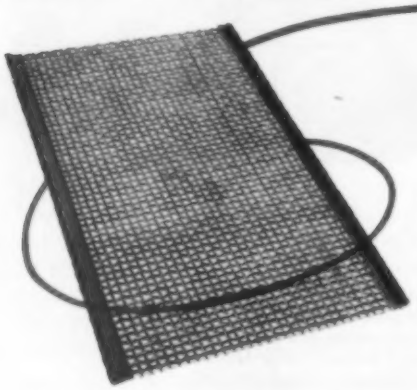
HANCO SCREEN HEATERS

ELIMINATE *Costly* SCREEN BLINDNESS



FASTER, MORE ACCURATE SIZING

HANCO electric heaters are engineered to meet top capacity requirements for heating **all** metallic screen cloth. Mechanical abuse such as "beating" or brushing can be **eliminated completely** when you install a HANCO electric heater. Treat your screens the modern way – get HANCO.



Available in five different assemblies. HANCO engineers have designed and constructed electrical screen heaters to fit YOUR make of screen. Note: Reduction in openings can be effected to meet ever changing specifications.

LOOK AT THESE FEATURES

Faster screening—faster processing means fewer "returns".

Elimination of mechanical abuse to keep screens open.

Longer screen life — no manual cleaning increases screen life up to 800%.

Fewer shut downs for replacement of worn screens.

HANCO quick change assemblies assure easy cloth changes.

Low maintenance cost. HANCO heaters are designed for heavy-duty service.

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PIONEERS IN ELECTRIC SCREEN HEATING – FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING

Secy. of Interior Announces New Posts in Mines Bureau

Appointments to a number of newly-created positions in the Bureau of Mines have been announced by Secretary of the Interior Douglas McKay.

The positions were established as part of the reorganization of the Bureau, and based on the report of a survey team appointed by Secretary McKay last year. They will become effective when the necessary changeover from the present Bureau organization can be accomplished, and the new organization is formally established, about January 1, 1955.

Thomas H. Miller, former assistant director for operations, becomes deputy director; Paul Zinner, formerly chief of the Minerals Division, becomes assistant director in charge of programs; Clifford W. Seibel, formerly a regional director, becomes assistant director in charge of helium operations; and James Westfield, formerly chief of the Health and Safety Division, becomes assistant director in charge of health and safety operations.

The new Washington headquarters division chiefs are as follows: Charles W. Merrill, Minerals Division; Louis C. McCabe, Solid Fuels Division; Roscoe A. Cattell, Petroleum and Natural Gas Division; Harry F. Weaver, Coal Mine Inspection Division; E. W. Pehrson, Foreign Division; and William E. Rice, Administrative Division.

The new regional directors, who will be in charge of all Bureau operations in their respective areas, with the exception of health, safety and coal-mine inspection work, include the following:

Stephen M. Shelton, Region I, Idaho, Montana, Oregon, and Washington, together with Alaska.

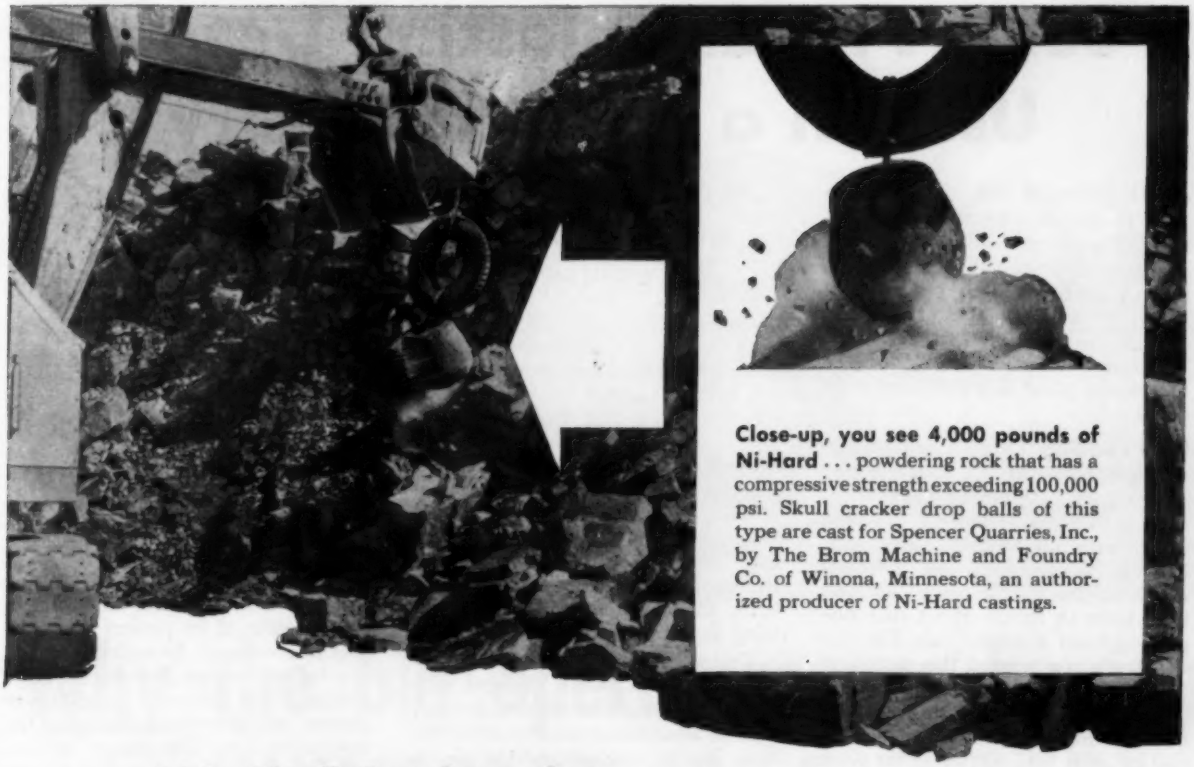
Harold C. Miller, Region II, California and Nevada.

John H. East Jr., Region III, Arizona, Colorado, Nebraska, New Mexico, North Dakota, South Dakota, Utah, and Wyoming.

Harold M. Smith, Region IV, Arkansas, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, and Texas.

Harold P. Greenwald, Region V, all states east of the Mississippi

(*Continued on page* 154)



Close-up, you see 4,000 pounds of Ni-Hard . . . powdering rock that has a compressive strength exceeding 100,000 psi. Skull cracker drop balls of this type are cast for Spencer Quarries, Inc., by The Brom Machine and Foundry Co. of Winona, Minnesota, an authorized producer of Ni-Hard castings.

This Skull Cracker gives

Twice the Life of Forged Steel

When made of Ni-Hard

Look at the picture, then read what Spencer Quarries, Inc., of Spencer, South Dakota, writes about their Ni-Hard® skull crackers:

> "... we get at least 100% more wear from these balls than we received formerly from drop forged steel. Our rock, over 99% silica, and very hard, will cut glass just like a diamond. Its compressive strength exceeds 100,000 pounds per square inch."

Whether you give them the job of secondary crushing in the cement industry ... or scrap-breaking in the metal working industry ... Ni-Hard drop balls prove their worth by saving money through long life.

Although abrasion resistance is the foremost property of Ni-Hard, the drop ball performance shows far less breakage than that experienced with steel balls.

To meet INCO's high standards, Ni-Hard is produced under foundry controls. Yet ... it's moderate in cost. Investigate how Ni-Hard can help you.

Your Copies are Ready

Write for the two booklets: "Engineering Properties and Applications of Ni-Hard," and "Buyers' Guide for Ni-Hard Castings." They are yours for the asking.

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Some Primary Blasting Devices Used in a Spanish Quarry

By CARLOS GASCUÑANA
Mechanical Engineer
Technical Vice General Manager,
Compania General de Asfaltos y Portland-Asland, Spain

THE principal aim of this article is to illustrate some of the practical primary blasting devices being utilized at the Yepes (Toledo, Spain) limestone quarry operation, which is owned by Compania General de Asfaltos y Portland-Asland. This quarry supplies raw material to the cement plant at Villaluenga de la Sagra.

New Loading Hook Large-sized cartridges are used in the primary blasting, some measuring as large as 6 in. in dia. by 70 cm. long (about 27½ in.). Because of their large size the cartridges are lowered into the 7-in. dia. blast holes by means of a pulley suspended from a tripod (see Fig. 1).

In order to prevent the cartridges from falling off the rope while being lowered, we devised a special bronze hook having two keels, with a rope tied to each keel. Other hooks were tried earlier, but with no success. With this new type of hook, the cartridge is lowered by means of the "suspension" rope (see Fig. 1). When the cartridge reaches the bottom, the "shooting" rope is pulled, thereby freeing the hooks from the cartridge (see Fig. 2). This procedure is very fast, and the results obtained have proved to be very successful.

Funnel For Bulk Loading The quarry face at the Yepes quarry is 15 to 16 meters high (about 60 ft.). A 5-m. by 5-m. drilling pattern (about 16- by 16-ft.) is used. As we use ammonium nitrate explosives with a low density (1.1), the available space for stemming is relatively small and there is in addition a tendency to rifling. We overcame this problem by suppressing the annular space between the 6-in. dia. cartridge and the usual 7-in. dia. drill hole through the use of bulk explosives. In this way the total height of the explosive column is diminished while the available length for stemming is increased.

Under the old method, in a 13.5 m. hole (about 44 ft.) charged with one 50-cm. long gelatin cartridge and with 10 ammonium nitrate cartridges, each 70-cm. long, the height of the explosive column was 7.5 m. This left 6 m. for stemming, which was found to be insufficient, particularly considering the fact that the upper 2.5 m. of the deposit consists of badly weathered limestone, which consequently is not too cohesive.

Under the new loading procedure the bottom gelatin charge is hooked to a detonating fuse and lowered into the hole. Then the ammonium nitrate cartridges are slit, and the powder is poured into the hold through a 3-mm. brass sheet funnel, shown in Fig. 3. The height reached by the ammoniated charge is inversely proportional to the square of the hole diameter. Thus:

$$\frac{7 \times 6^2}{7^2} = 5.14 \text{ m.},$$

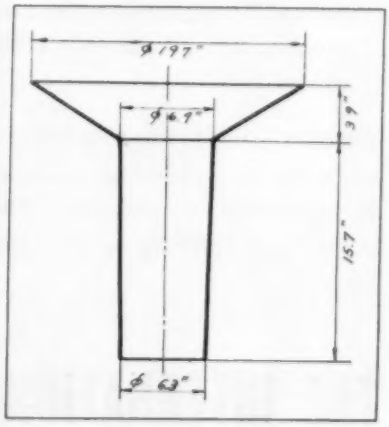
so we increase the length of column available for stemming by 7 – 5.14 = 1.86 m. This leaves 7.86 m. for stemming, rather than the unfavorable amount of 6 m. The funnel shown in Fig. 3 weighs only 11 kg. (about 24 lb.) and is very easy to handle.

Tamping When the length available for stemming is reduced, the necessity of its perfect compactness is increased. In order to avoid any failure, we use damp screenings, tamping the material carefully to prevent any stone from damaging the detonating fuse. The tamper we employ is of the type shown in Fig. 4, consisting of a wrapping sheet of brass filled with molten lead. The total weight of the tamper is 10 kg. The screenings are poured into the blast hole while the tamper is moved in an up and down motion. The material then fills the annular space between the tamper and the drill shank. Earlier we employed a cylindrical tamper, but it would stick because the damp screenings formed a compact plug above the tamper. For this reason we made the upper part conical-shaped. The base was made spherical in order that the movement of the tamper would not damage the fuse.

Right: Fig. 1—A tripod and pulley are used for lowering a 6- by 27½-in. cartridge into the blast hole. Note special brass hook fitted with two keels.

Below: Fig. 2—Closeup of the brass hook. Pulling the rope on the right frees the hook from the cartridge.

Fig. 3—Sketch of the brass funnel used in the bulk loading of ammonium nitrate explosives.



Why the big operators are buying the UNIVERSAL 880 Senior "R"

No other gravel crushing plant in its weight class can challenge the Senior "R"'s output.

1. **More Tonnage From Screen —** 4' x 12' screen with full 48 square feet of screening area **plus** inclined mounting gives 25% or more output.
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4. **Big 30" Conveyors —** You need extra wide conveyors to handle the Senior "R"'s high output . . . and you get them! Channel frame design for ruggedness — not formed frames.
5. **All This In A Portable Plant —** designed to meet state highway weight restrictions.
6. **Low Initial Cost —** Low maintenance.

NO OTHER PLANT HAS ALL THESE FEATURES

These are but a few of the reasons why the big operators, who keep a careful check on operating costs and production records, buy the Senior "R". Compare it feature for feature with other plants and prove this to yourself . . . UNIVERSAL'S THE BUY! For complete information see your nearest Universal distributor, or write to Universal Engineering Corporation, 619 C Avenue, N.W., Cedar Rapids, Iowa.

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Fig. 4—View of the conical-shaped combination brass-lead tamper for packing the damp screenings used as stemming.

Rotary-Type Blasting Machine We use a delay of 0.025 sec. in our blasts, and the result is excellent fragmentation; consequently very little secondary blasting is required. Patterned after F. L. Miller's retarder, the unit we built is illustrated in Figures 5 and 6. To each of the thin sheets of a stationary collector H is connected one of the leads of each instantaneous electric blasting cap; the other end is connected to a common conductor. However, one of the thin sheets is not connected, this position representing point O (the first hole) when the retarder is started.

A small non-synchronous tri-phase motor powers the unit, rotating the

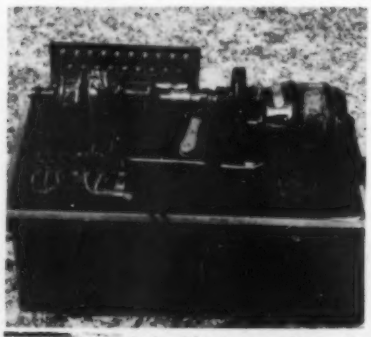


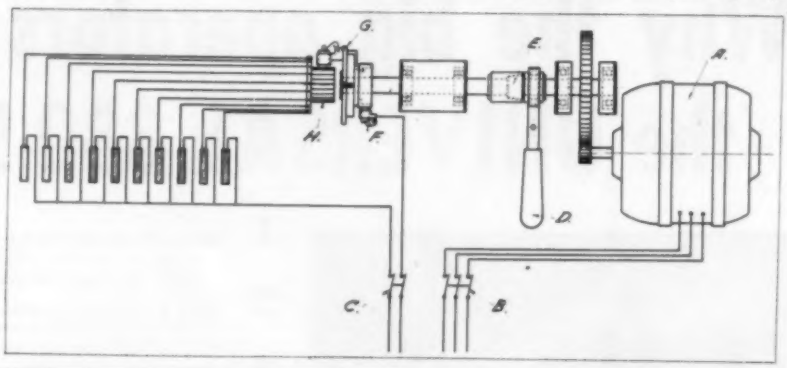
Fig. 6—View of the blasting machine. Up to 19 holes are fired at one time.

cone of the clutch E by means of a reduction gearing. When the collector is in position O, switches B and C are closed and motor A is started. When the latter has reached its normal speed, the clutch is engaged by means of the lever D, thus rotating the output shaft, which has on its end the keel brush holder G. The latter successively closes the circuits of detonators; the delay interval depends upon the rotational speed of G and upon the number of thin sheets of the collector. Clutch E is very useful, since it provides the delay as exactly as we have calculated it. The clutch does not slip because the resistance is practically nil, and the only stress it is under is the one necessary to drag the keel to which the movable brush G is linked.

As may be seen in Fig. 6, an insulating bridge has been mounted on Switch C; it is closed by a padlock to prevent persons other than the blasting foreman from closing the round circuit.

By means of the blasting machine described above, we shoot up to 19 holes at a time, which provides us with enough stone for a month and a half. By changing the collector and the reduction gearing, the number of holes per shot may be increased as desired.

Below Fig. 5—Diagram of the rotary-type blasting machine used at the Spanish quarry.



Secretary of Interior

(*From page* 150.)

River, except Mississippi, plus Minnesota and Iowa.

The reorganization made on the basis of the survey team recommendations reduces the number of regions from nine to five, and increases the number of Washington headquarters divisions from four to seven.

Washington headquarters divisions prior to the reorganization were as follows: Minerals, which is substantially unchanged; Fuels and Explosives, now divided into the Solid Fuels Division and the Petroleum and Natural Gas Division; the Health and Safety Division, now divided into the Health and Safety Division and the Coal Mine Inspection Division; and the Administrative Division, the functions of which have been changed but little. The new Foreign Division takes over the functions and duties of former Region IX.

Marquette Names Sam Webb Superintendent at Brandon

Sam Webb, who was formerly acting chief of Marquette Cement Manufacturing Company's Brandon, Miss., plant for the last several months, was promoted on September 30 to the post of superintendent and chief chemist there. This announcement was made by Frank Moyle, Marquette vice-president, who is director of operations for all Marquette plants.

Mr. Webb had served as acting chief at Brandon since the transfer of William Moyle, the former superintendent at this plant, to Marquette's plant in Superior, Ohio.

P.C.A. Wins N.S.C. Award For Promotion of Safety

The Portland Cement Association was presented with the National Safety Council's award at the 42nd National Safety Congress held in Chicago, October 18-22, and cited for its outstanding work in promoting safety in the plants of its members. The award was presented by E. C. McFadden, council vice-president for industry at a special luncheon meeting Oct. 19.

The award gives recognition to associations for the general excellence of their safety services and for their contribution to the reduction of occupational injuries in their industries. In making the award the council's technical committee and committee of judges took into consideration accident prevention activities such as publicity, safety conferences, contests, and publication of technical material.

MERRITT R. ROYER has been appointed district engineer for The Asphalt Institute. His area includes Arkansas, Missouri, eastern Kansas, and eastern Nebraska. His headquarters will be in Kansas City, Mo.

MURPHY DIESEL POWER

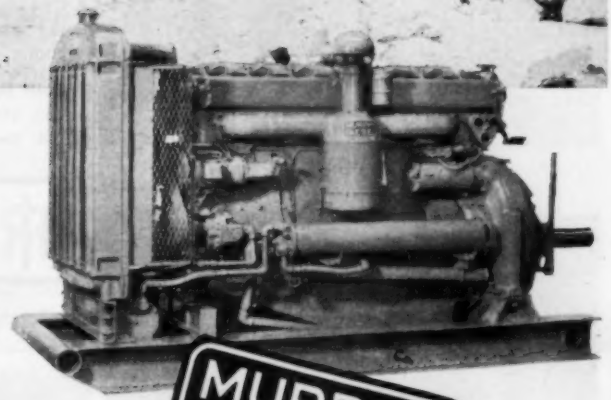
all the way on this job...

. . . turns out over 100 tons of limestone and flint rock per hour

● From this Kansas pit, W. O. Homer of Junction City, Kansas, is turning out 100 tons of limestone and flint per hour, with flint accounting for about 20% of the total. Mr. Homer is doing this job with a Murphy Diesel powered Northwest shovel and a Murphy Diesel powered Universal portable crushing plant. So it's Murphy Diesel all the way on this job.

If you're looking for dependable output at maximum operating economy, profit by the experience of pit and quarry operators everywhere, and put Murphy Diesel power to work for you. It's your best bet for getting the most rock per gallon of fuel and you'll particularly like the trouble-free service and freedom from costly downtime.

Talk over your requirements with your Murphy Diesel Dealer and ask him to show you what Murphy Diesel power can do for you.



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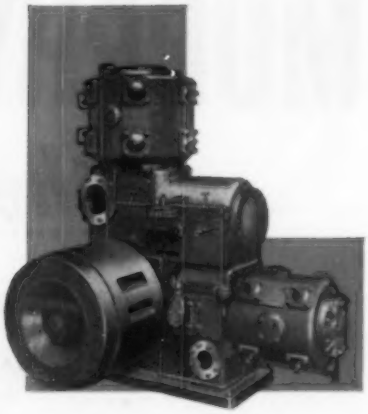
Sales, parts, service throughout the nation

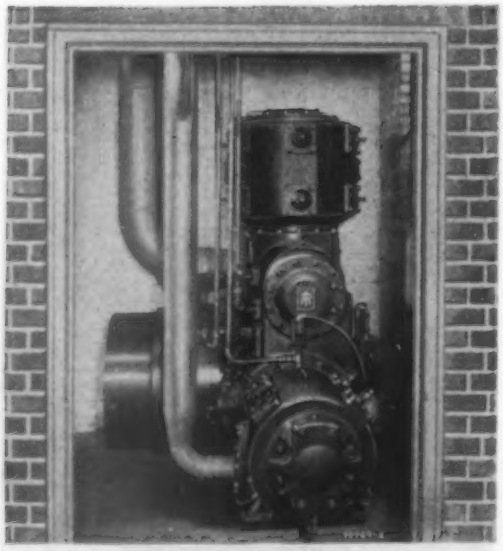
Heavy duty power
for rock crushing

Murphy Diesel Engines and Power Units are available in sizes from 90 to 240 H.P. Engine speeds are 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 154 K.W.

MORE AIR POWER in less floor space

That's one of the many advantages offered by this space-saving **XLE** *compressor:*





A bronze company squeezed this XLE into a small, unused storage room.

Packaged design for minimum floor space, and specially balanced for minimum foundation... ideal for skid-mounting.

Easy to operate... push button starting, grouped controls, automatic force-feed lubrication, automatic condensate removal, automatic air-operated starting unloaders and capacity control.

Easy to install or relocate... ready-to-run, assembled shipment ... simplified air and water piping.

Easy to maintain... simplified long-life construction... full-floating, cool-running, aluminum-alloy bearings that require no adjustment... no need to open the sealed crankcase which stays clean inside... streamlined exterior also easy to keep clean.

Low operating costs... new high-efficiency, long-life I-R Type A Channel Valves result in compressor efficiency comparable to the largest units... durable, high-efficiency tube-and-fin intercooler saves water... efficient direct-connected motor.

Built for reliable, continuous full-load service... sizes 125, 150, 200, 250, 300, 350 horsepower... discharge pressures 80 to 125-psi, two stage... write for more information today.

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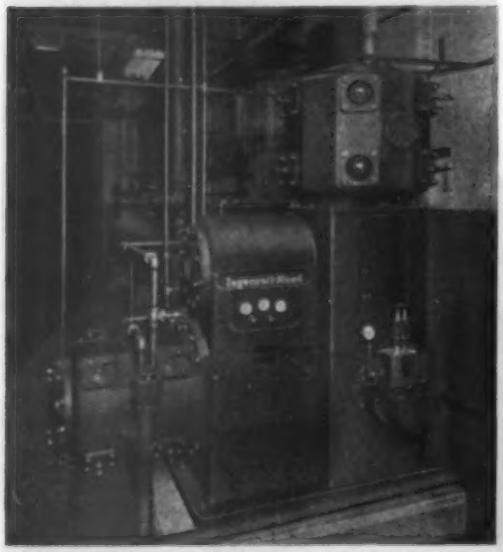

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2137

N.C.S.A. Safety Contest

(From page 39.)

all 53 operations participating in the 1953 contest. These injury-free plants, and man-hours worked (excluding the trophy winner), were as follows:

Kimballton mine, The Standard Lime and Stone Co., Kimballton, Va., 156,818.

Bakerton mine, The Standard Lime and Stone Co., Bakerton, W.Va., 152,088.

Red Hill quarry, Superior Stone Co., North Garden, Va., 135,772.

White Haven quarry, The General Crushed Stone Co., White Haven, Pa., 128,629.

Bakers quarry, Superior Stone Co., Monroe, N.C., 121,813.

Bedford quarry, Blue Ridge Stone Corp., Bedford, Va., 111,136.

Auburn quarry, The General Crushed Stone Co., Auburn, N.Y., 100,241.

Rock Hill quarry, The General Crushed Stone Co., Quakertown, Pa., 90,125.

Watertown quarry, The General Crushed Stone Co., Watertown, N.Y., 82,647.

Cedar Hollow quarry, Warner Company, Devault, Pa., 82,064.

Jordanville quarry, The General Crushed Stone Co., Jordanville, N.Y., 73,215.

Holston quarry, American Limestone Co., Mascot, Tenn., 60,280.

Joliet quarry, Lincoln Crushed Stone Co., Joliet, Ill., 55,987.

Stoughton quarry, Stoughton Crushed Stone Co., Stoughton, Mass., 42,120.

Prospect Stone Plant No. 6 quarry, Eastern Rock Products, Incorporated, Prospect, N.Y., 41,420.

Waukesha quarry, Waukesha Lime and Stone Co., Inc., Waukesha, Wis., 30,080.

Randville quarry, Superior Rock Products Co., Iron Mountain, Mich., 12,600.

Statistics—The rates of frequency and severity of injuries at the 53 enrolled operations in 1953 were considerably lower than their respective averages for the 28-year history of the contest. The frequency rate of 17.273 injuries per 1,000,000 man-hours was the second-lowest annual rate, 41 percent better than the 28-year average, and a 19 percent improvement compared with the rate of the previous year. The severity rate of 2.336 days lost per 1,000 man-hours was the second-best annual rate, 56 percent lower than the 28-year average, and a 34 percent improvement over the 1952 rate.

Man-hours of worktime at the competing plants in 1953 totalled 7,815,856,—6,555,333 at quarries and 1,260,523 at underground mines. During this volume of worktime, there were 135 lost-time injuries. Of this total, 9 were permanent-partial and 126 were temporary-total disabilities. Neither a fatality nor a permanent-total injury was reported.

Forty-seven open quarries and six underground mines were enrolled in the 1953 competition. The injury-frequency rate at the quarries was 18.763 per 1,000,000 man-hours and the severity rate was 2.711 days lost per 1,000 man-hours. The frequency rate, a 15 percent improvement over the 1952 rate, was 36 percent lower than the average rate for the 28 years of the contest and it was the fourth-best rate in the history of the competition. The severity rate, the fifth-lowest rate yet recorded, was 35 percent lower than the 1952 rate and 47 percent better than the 28-year average.

At the six underground mines enrolled in the 1953 competition, the injury-frequency rate of 9.520 per 1,000,000 man-hours was the third-lowest rate recorded since the beginning of the contest in 1926; it was 43 percent lower than the 1952 rate and 68 percent better than the 28-year average. The severity rate of 0.386 day per 1,000 man-hours of work was bettered in only one year, 1937, when the rate was 0.250 day. The 1953 rate was almost 25 percent lower than the 1952 rate and 94 percent lower than the average for the history of the contest.

Causes and Severity of Injuries—Accidents involving the handling of materials were responsible for almost 25 percent of all injuries for which stated causes were reported. Falls of persons accounted for 14 percent; haulage accidents, 12 percent; flying objects, 8 percent; and falls and slides of rock, and accidents from stepping on objects each caused 7 percent.

The Competition—This competition is one of several conducted by the Bureau of Mines for the promotion of safety in the mineral industries of the United States. The National Crushed Stone Association Safety Competition is conducted under the same rules as the National Safety Competition and the same records submitted by participating companies are used in both contests. However, there are two additional requirements for the crushed stone competition. The operation must have commercial production of crushed stone, and the company must be a member of the association. Application forms and rules of the contest may be secured from the Accident Analysis Branch, Health and Safety Division, Bureau of Mines, Department of the Interior, Washington 25, D. C.

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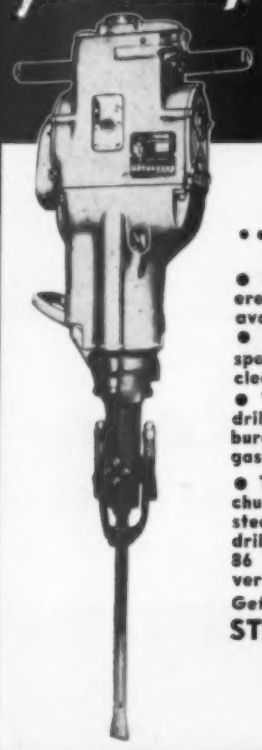

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Announce Winners of 1953 Safety Contest Sponsored by National Sand & Gravel Assn.

WINNERS of top safety honors in the 25th annual National Sand and Gravel Association Safety Competition, conducted by the U. S. Bureau of Mines, are the Eliot No. 104 plant of Pacific Coast Aggregates, Inc., at Pleasanton, Calif.; the Quigley plant of the Hurst Gravel Company at Hurst, Tex.; and the No. 7A plant of the Lyman-Richey Sand and Gravel Corporation at La Platte, Ark. Each of these three operations was awarded a trophy, provided by *Rock Products* magazine, for having achieved the best record in each of the three groups into which the competition is divided. N.S.G.A. also awarded a Certificate of Achievement to each trophy winner and a Certificate of Accomplishment in Safety to each production worker at these plants. To each of the 40 operations at which 20,000 man-hours or more were worked during the year with no lost-time injuries, a Certificate of Achievement in Safety was also presented by N.S.G.A.

Plants Working Over 100,000 Man-Hours—The Eliot No. 104 plant, a wet-pit operation of Pacific Coast Aggregates, Inc., for the second consecutive year had the best safety record in this group. In 1953 this plant did not have a disabling injury during a total operating period of 152,857 man-hours. Thus, in the two years it has been a trophy winner, the Eliot No. 104 plant has been injury-free during a total worktime of 314,521 man-hours. The plant has been a participant in the competition for the last 7 years, and during that time it has been operated a total of 1,018,042 man-hours without a fatality, a permanent-total, or a partial-permanent injury.

Plants Working from 50,000 to 99,000 Man-Hours—A veteran contestant, the Quigley plant of the Hurst Gravel Company, returned to the winners' circle in 1953 for having an injury-free record during a worktime period of 98,425 man-hours. In 1944 this plant was awarded the trophy by virtue of a similar excellent safety record over a work period of 96,142 man-hours. During its 21 years of participation in this annual contest, the Quigley plant was operated a total of 1,570,019 man-hours without a fatality or a permanent total injury. It is noteworthy that during 11 of the 21 years this plant has been a competitor in the safety contest, it has had injury-free records. In this group, 11 other sand and gravel operations had no disabling injuries during the year.

Plants Operated 50,000 or Fewer Man-Hours—Plant No. 7A of the Lyman-Richey Sand and Gravel Corporation, a dredge operation, won the trophy for operating 48,298 man-hours in 1953 without a lost-time injury. This is the second time this plant has been similarly honored during the eight years it has been enrolled in the competition. In 1951 it won top honors in this group for operating 44,646 man-hours without a lost-time injury. A total of 35 sand and gravel plants competing in this group also reported no lost-time injuries.

Injury-Free Plants—The following plants, excluding the three trophy winners, were operated 20,000 or more man-hours injury-free during 1953 and for this outstanding achievement were awarded Certificates of Achievement in Safety by

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the National Sand and Gravel Association. In addition to these 37 plants, 12 other operations worked the full year without a lost-time injury, but due to the minimum requirement of 20,000 or more man-hours of work, were not eligible for a Certificate. It is noted that these plants have competed year after year with full knowledge of their ineligibility for award. Their efforts and enthusiasm to reduce accidents in the sand and gravel industry are highly commendable.

Marquette wet-pit plant, Marquette Cement Manufacturing Co., Memphis, Tenn., 142,301 man-hours.

Eagle Lake dredge plant, Texas Construction Material Co., Eagle Lake, Tex., 129,540 man-hours.

Dredge *Franklin* plant, Warner Co., Tullytown, Pa., 117,095 man-hours.

Roscoe No. 2 dry-bank plant, Consolidated Rock Products Co., Sun Valley, Calif., 113,862 man-hours.

Fair Oaks No. 111 dry-wet pit plant, Pacific Coast Aggregates, Inc., Fair Oaks, Calif., 91,465 man-hours.

Centerville No. 106 dry-wet pit plant, Pacific Coast Aggregates, Inc., Centerville, Calif., 90,657 man-hours.

Alleyton wet-pit plant, Texas Construction Material Co., Alleyton, Tex., 85,950 man-hours.

Hollimon wet-pit plant, Texas Construction Material Co., Eagle Lake, Tex., 71,780 man-hours.

Kerlinger No. 114 dry-pit plant, Pacific Coast Aggregates, Inc., Tracy, Calif., 68,947 man-hours.

Cayuga dry-bank plant, Material Service Corp., Cayuga, Ind., 68,577 man-hours.

Nos. 9-10-11 dredge plants, Lyman-Richey Sand & Gravel Corp., Valley, Nebr., 61,952 man-hours.

Northport dry-bank plant, Metropolitan Sand & Gravel Corp., Northport, N. Y., 57,041 man-hours.

Ricks wet-pit plant, Texas Construction Material Co., Ricks, Tex., 56,240 man-hours.

Nos. 5-6 dredge plants, Lyman-Richey Sand & Gravel Corp., Plattsmouth, Nebr., 50,734 man-hours.

Greene-Grano dry-pit plant, J. L. Shiely Co., Grano, N. D., 50,290 man-hours.

Bennett wet-pit plant, Tarrant Gravel Co., Birdville, Tex., 41,971 man-hours.

Lincoln dredge plant, The Lincoln Sand & Gravel Co., Lincoln, Ill., 41,751 man-hours.

Nos. 12-13 dredge plants, Lyman-Richey Sand & Gravel Corp., Fremont, Nebr., 36,875 man-hours.

Yardley wet-pit plant, Union Sand & Gravel Co., Spokane, Wash., 36,263 man-hours.

No. 2A dredge plant, Lyman-Richey Sand & Gravel Corp., La Platte, Nebr., 35,111 man-hours.

No. 390 dredge plant, Consumers Co., Lacon, Ill., 34,132 man-hours.

Chillicothe dry-pit plant, Basic Construction Materials Co., Chillicothe, Ohio, 32,900 man-hours.

South Bend dry-bank plant, Western Indiana Gravel Co., South Bend., Ind., 31,764 man-hours.

Akron dry-bank plant, Rubber City Sand & Gravel Co., Akron, Ohio, 31,520 man-hours.

Claremont No. 11 dry-bank plant, Consolidated Rock Products Co., Claremont, Calif., 31,452 man-hours.

Sierra No. 19 dry-bank plant, Consolidated Rock Products Co., Monrovia, Calif., 31,073 man-hours.

Butlerville dry-bank plant, Utah Sand & Gravel Products Corp., Salt Lake City, Utah, 28,874 man-hours.

"AS" dry-bank plant, The Buffalo Slag Co., Inc., Alfred Station, N. Y., 25,524 man-hours.

Fort Wright dry-pit plant, Union Sand & Gravel Co., Spokane, Wash., 25,087 man-hours.

Yolo No. 131 wet-pit plant, Pacific Coast Aggregates, Inc., Yolo., Calif., 24,228 man-hours.

Leesburg dredge plant, Western Indiana Gravel Co., Leesburg, Ind., 23,945 man-hours.

Trenton No. 2 dry-pit plant, Eastern Rock Products, Inc., Barneveld, N. Y., 23,217 man-hours.

South Bend dry-pit plant, South Bend Sand & Gravel Corp., South Bend, Ind., 22,430 man-hours.

Olympia No. 125 dry-pit plant, Pacific Coast Aggregates, Inc., Felton, Calif., 22,219 man-hours.

Hewitt No. 3 dry-bank plant, Consolidated Rock Products Co., North Hollywood, Calif., 21,188 man-hours.

Estherville dry-pit plant, Estherville Sand & Gravel Co., Estherville, Iowa, 20,215 man-hours.

"F" dry-bank plant, The Buffalo Slag Co., Inc., Franklinville, N. Y., 20,109 man-hours.

Statistics—The number of sand and gravel plants—131—was a record enrollment for the association's 25-year history of the safety compe-

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Gilson Testing Screen

The GILSON Screen cuts out error and guesswork in meeting sizing specifications for crushed stone, gravel, slag, coal, ores, and similar materials.

You can own and maintain a GILSON Screen for only 65-cents per 1,000-tons production in your plant, according to our sales and service records.

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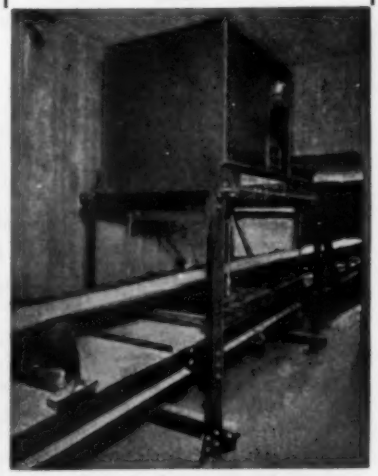

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The Merrick Weightometer accurately and automatically weighs and records a continuous flow of material passing over the conveyor belt without any interruption to the conveyor operation.

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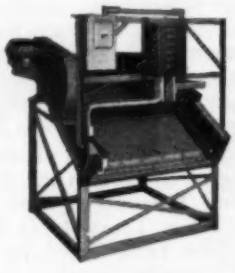

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tition, the aggregate worktime at these plants—9,520,749 man-hours—was a record high, and the number of plants—52—that were operating during the year without a disabling injury was the largest number ever recorded. Further, the frequency rate of 25.103 injuries per 1,000,000 man-hours for the 1953 contest was the third-lowest rate on record. The severity rate of 4.261 days per 1,000 man-hours was almost twice that of the 1953 rate (2.110), due entirely to the increase in the number of fatalities.

A total of 239 disabling injuries was recorded in 1953 resulting in 6 deaths, 4 permanent-partial, and 229 temporary injuries; no permanent-total injury was reported. The average disability of the permanent-partial injuries was 169 days and that for temporary-total injuries 17 days, while in 1952 averages were 858 and 20 days respectively.

A total of 93 bank and pit operations and 38 dredge plants were enrolled in the 1953 competition. The injury-frequency rate for banks and pits was 26.656 per 1,000,000 man-hours and the rate for dredges was 22.167. While injury-frequency rate was more favorable at dredge operations in 1953, the severity experience was reversed—3.411 days at the former plants and 5.869 days at the latter.

Causes of Injuries—Of the 239 disabling injuries at competing plants in 1953, accidents involving the handling of objects, falls of persons, haulage, falling and flying objects, and machinery accounted for a total of 168 or 70 percent of all injuries reported. The six fatalities were divided equally in the two competing groups. At bank and pit plants, one man was killed in a machinery accident, one met death in a haulage accident, and the third man was caught under a slide of material. At dredge plants two workers were electrocuted and one fell to his death. Excluding the fatalities, the most serious injuries resulted from machinery accidents, handling objects, haulage accidents, falls of persons, and falling objects. The average loss in days per disabling injury at bank and pit plants was 128; at dredge plants it was 265.

Scope—Sand and gravel plants in 25 states were enrolled in the 1953 competition. Twenty-five were in California, 22 in Texas, 14 in Illinois, 9 in New York, 8 each in Indiana and Nebraska, 5 each in Iowa and Pennsylvania, 4 in Louisiana, 3 each in Michigan, North Carolina, Ohio and Utah, 2 each in Massachu-

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***Fourteen* years of experience . . . *eight* years with production models . . . *thousands* of torque converter tractors out in the field . . . *millions* of operating hours on every kind of work.**

TODAY'S tractor owners have given their "stamp of approval" to torque converter drive—as a key factor in the new standards of tractor performance they need for today's closely-bid jobs. Here's why —

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But, remember, you don't buy just one feature . . . you buy a *tractor*, with torque converter drive designed as a matched part of the entire machine. This advanced drive is only *one* of the many outstanding features that have switched so many leading contractors to Allis-Chalmers tractors. So . . .

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Service Simplicity of Unit Construction — Power drive components can be easily removed, repaired or replaced without disturbing adjacent parts . . . saving time and money.

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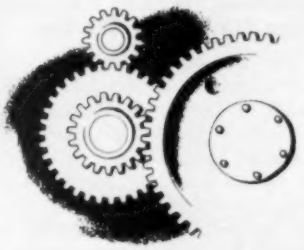

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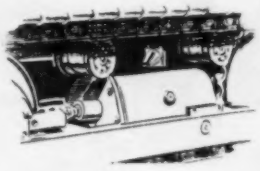

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setts, Minnesota, Missouri, North Dakota, Tennessee, Washington, and Wisconsin, and 1 each in Arkansas, Kansas, New Jersey, Oklahoma, and West Virginia.

The Competition—Enrollment of operations of the association members in the National Sand and Gravel Safety Competition, sponsored and conducted annually by the Bureau of Mines, automatically entitles these operations to compete in the National Sand and Gravel Association Safety Competition. Enrollment applications, rules, and information on the contests are available upon request from the Accident Analysis Branch, Health and Safety Division, Bureau of Mines, Washington 25, D. C.

Standard Portland Cement Wins 8th Safety Citation

For the eighth time since 1928, the Standard Portland Cement Division of Diamond Alkali Company at Painesville, Ohio, has won the National Safety Council's Certificate of Commendation for outstanding safety performance.

Gordon C. Huth, chairman of the accident prevention committee, cited the company's 1953 accident-free record—300,864 man-hours without a disabling injury. Diamond's Standard Portland Cement Division previously won the award in 1928, 1934, 1935, 1944, 1946, 1950, and 1951.

Sulphur Exploration Company To Work Hockley Dome Area

Sulphur Exploration Company, a new firm formed by Houston industrialists, has leased over 7,000 acres in the Gulf Coast area, including approximately 2,100 acres on Hockley Dome in Harris County, Tex.

According to William Stacy, company spokesman, drilling will start as soon as the firm's stock has been sold. It is planned to use the Frasch process. Officers include the following: Marvin Weaster, formerly with the Duval Sulphur and Potash Company, president; Jerome Solomon, vice-president; Irvin Kaplan, secretary; and Michael S. Spolane, treasurer.

Dragon Cement Company, New York, N. Y., issued two additional shares to holders of record of each of the 170,123 outstanding authorized shares of Sept. 11, thereby effecting a three-for-one split.

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- For belts ⅜" to ½" thick.
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STATEMENT OF OWNERSHIP

Statement required by the Act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of PIT AND QUARRY, published monthly at Chicago, Illinois, for October 1, 1954.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, PIT AND QUARRY PUBLICATIONS, INC., Chicago, Ill.; Editor, W. E. Trauffer, same; Managing Editor, W. E. Trauffer, same; business Manager, William A. Wilson, same.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

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Melva Mae Utley, same.
William T. Klussman and Lanetta B. Smith, Trustees of Bernice Joan Smith, Trust No. 1, Chicago, Ill.

William T. Klussman and Lanetta B. Smith, Trustees of Harry William Smith, Trust No. 1, same.

William T. Klussman and Lanetta B. Smith, Trustees of Ray Light Smith III, Trust No. 1, same.

William T. Klussman and Lanetta B. Smith, Trustees of Stephen Howard Smith, Trust No. 1, same.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

W. A. WILSON,
Signature of Business Manager.

Sworn to and subscribed before me this 27th day of September, 1954.

(SEAL) FRANK J. CORNYN.

(My commission expires Sept. 4, 1958.)

At a pit near Corvallis, Oreg., two companies have set up plants for processing sand and gravel. The Island Sand and Gravel Company, owned by Jack Taggart of Salem, Oreg., supplies material for the other concern, Warren Northwest, Inc., which produces asphalt.

personal mention

John M. Neff

JOHN M. NEFF, who has been active in research and development for more than 25 years, has succeeded DR. EINER P. FLINT as manager of the Ceramics and Minerals Research Department at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Mr. Neff joined the Foundation as a ceramic engineer in 1946 and was promoted to assistant manager in 1950. Previously he had been associated with various other concerns, among them the U.S. Gypsum Company. Since he has been with the Foundation, Mr. Neff has participated in several important projects, including the development of "Kanamite", a small grain lightweight aggregate for making concrete, mortar, plaster mixes, and other building materials.

Dr. Flint resigned to accept a position as director of inorganic research at the Mallinckrodt Chemical Works, St. Louis, Mo.

BRADFORD D. HUTCHINSON, auditing supervisor in the transportation department of the National Gypsum Company in Buffalo, N. Y., has been elected president of the Buffalo Traffic Club.

R. P. RESCH has retired after 32 years with International Minerals & Chemical Corp., for the last 13 of which he held the offices of vice-president and treasurer. He was a guest of honor at a recent luncheon given by Louis Ware, president of the corporation.

LAWRENCE R. TIERNEY and JOHN M. ROBB JR. were recently elected vice-presidents of the Pennsylvania Foundry Supply & Sand Company, Philadelphia, Pa.

The appointment of ROBERT R. HEIGES as sales manager of the Ruberoid Company's newly-formed gypsum division has been announced by E. J. O'Leary, vice-president in charge of sales.

Mr. Heiges has spent all of his working career as a sales executive in the building materials business. In his new position he will have charge of sales of all gypsum products made by the company with headquarters at the executive offices in New York City.

J. G. BRAGG, director of technical service of the Alpha Portland Cement Company, Easton, Pa., retired from this post after having been with the company for over 27 years. He came to Alpha on March 16, 1927, as service engineer in the sales department and since then has served as eastern sales manager, general sales manager, assistant to the president, and in his present post.

Mr. Bragg was previously with the U. S. Geological Survey, the U. S. Bureau of Mines, and the New Jersey State Highway Department.

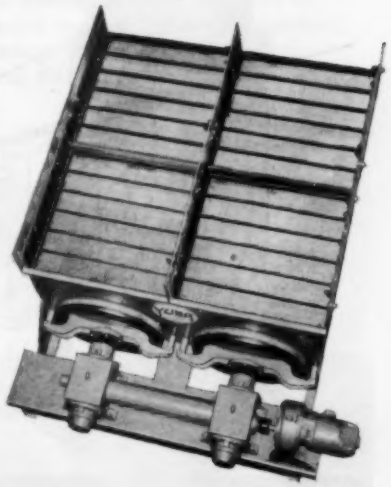
A. T. HERSEY, who was formerly field engineer for the Chicago, St. Louis, and Ironton (Ohio) sales districts of Alpha, succeeds Mr. Bragg. He is a graduate in civil engineering of the University of Illinois, and worked with the Illinois Highway Department before becoming associated with Alpha; he is a registered professional engineer in Illinois.

E. K. CLARK, vice-president of the Johns-Manville Sales Corporation, has been elected president of the National Mineral Wool Association.

A. T. KEARNEY, president of the Zonolite Company, Chicago, has been elected chairman of the board of directors, replacing Philip D. Armour. Mr. Kearney will continue as president, his position since 1939. Mr. Armour will continue as a director.

HOWARD JACOBSEN, former assistant district head of the National Gypsum Company, Chicago office, has been promoted to Detroit district manager.

YUBA JIGS
for black sands



Handle any material that can be concentrated, such as

CASSITERITE	RUTILE
GOLD	SCHEELITE
PLATINUM, ETC.	GARNETS
MONAZITE	SAPPHIRES
ZIRCONIUM	IRON
ILMENITE	COPPER

YUBA jig action is positive. Just set to desired speed and stroke, get constant uniform pulsations that create surface action over full area of jig bed. Result: YUBA M-8 jigs have large material capacity per flow line under full control.

Stroke adjustments between ¼" minimum and 3" maximum are easily and quickly made. Maximum frequency of a 4 cell M-8 jig is 350 at ¼".

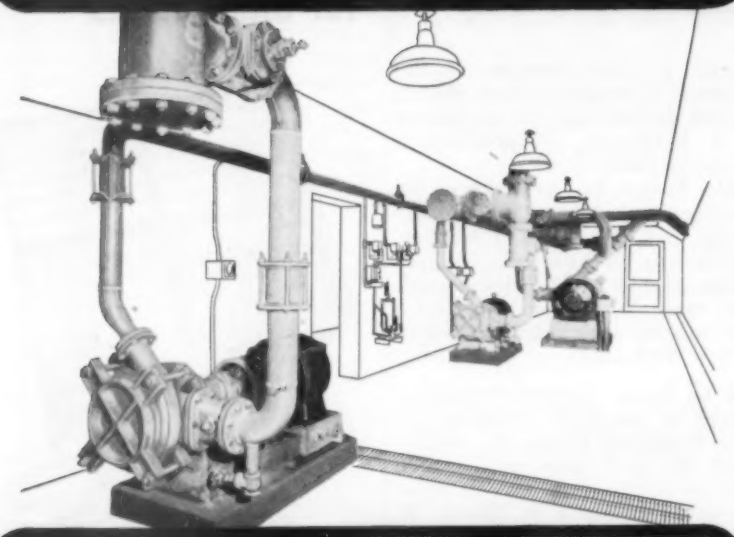
YUBA jig design saves space, increases production in new or old dredges or mills. Use to supplement existing jigs or replace other concentration methods. For details of adapting YUBA jigs to your operation, send us data on ore, feed sizes and present installation.

76

YUBA DREDGES — PROVED DEPENDABILITY

YUBA MANUFACTURING CO.
Room 718 • 351 California St. • San Francisco 4, Calif.

Handles extremely thick slurries with high specific gravities



MORRIS Type R SLURRY PUMP

Heavy viscous slurries with solids ratios as high as 70% by weight are not unusual loads for a Morris Type R Slurry Pump.

A case in point is this Morris installation at the Missouri Portland Cement Co., St. Louis, Mo. The two Morris 3R Pumps in the foreground each handle 200 GPM of a cement slurry at 64% solids with 1.66 specific gravity. Speed is 1180 RPM. The 6R Pump in the background handles 600 GPM of the same slurry at 880 RPM.

Long operating life... little or no maintenance

Massive running parts of the Type R compensate for the increased load imposed by high specific gravities. Hydraulic passages are deliberately designed for high concentrations of solids—the result of careful study of wear patterns shown by pumps in the field handling all kinds of abrasive materials. Elimination of areas of throttling and turbulence assures uniform wear of all parts.

There are no internal studs or bolts—no troublesome internal joints and fits. The suction disc liner is merely *clamped* into position between disc and shell. The absence of high stress on the shell permits wide variations in its composition—including materials of high abrasive resistance—to resist wear and extend the operating life of the pump.

Let our engineers consult with you on your slurry pump problems. They'll give you the benefit of 88 years of pump-building experience. Or, write for Bulletin 181.

MORRIS MACHINE WORKS
Baldwinsville, New York
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

Five new assignments on the sales force of Kaiser Gypsum Company have been announced by Colin Campbell, general sales manager.

JOHN A. FEELEY has been assigned to specialty contact work in plaster and lath products and will work with the company's representatives in northern California.

DOUGLASS J. MCCLELLAN is new sales representative in the northern California area, which includes the territory from Oroville to southern Oregon, with headquarters in Redding.

WAYNE MULLIN has been named representative for the San Francisco Bay Peninsula area.

JAMES E. STARK has been assigned to the Central Valley area and will make his headquarters in Stockton.

WILLIAM C. SYLVIES was appointed sales representative in the San Francisco area. All, with the exception of Mr. Stark, were formerly in the Kaiser sales department.

JESSE E. BUCHANAN, former president of the University of Idaho, recently became president of the Asphalt Institute. Mr. Buchanan succeeds Bernard E. Gray, who retired on July 1.

MORGAN MCCALL, Baton Rouge, La., has been named to the staff of Texas Industries, Inc., Dallas, Tex., leading producers of aggregates and concrete building products. Mr. McCall will serve as assistant to Ralph B. Rogers, president. For the last five years he has been vice-president and general manager of Dunham Wilson Company, Inc., steel fabricators in Baton Rouge.

The board of directors of the Riverside Cement Company have elected HOWARD B. STARKE vice-president and technical director and R. E. BOUER vice-president in charge of personnel.

Garner Beckett, president of Riverside, announced JOHN M. KINARD was named general manager and WILLIAM G. HENSHAW III was elected a member of the board.

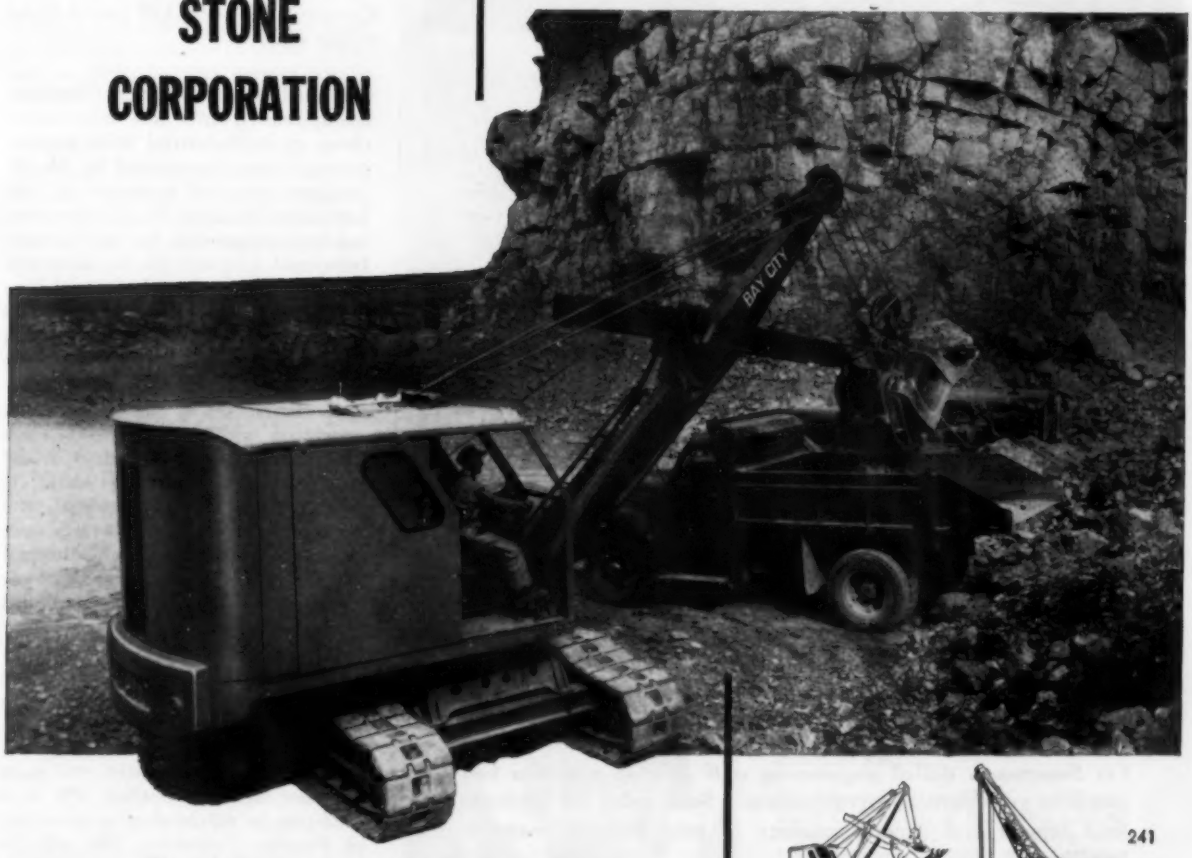
MICHAEL KUZMA, a specialist in marketing, has been added to the staff of the corrosion engineering department of the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Mr. Kuzma will be engaged with marketing programs for Pennsalt's line of corrosion engineering products.

BAY CITY

¾-YARD SHOVEL handling 800-1000 tons blasted rock per day for the CATSKILL MOUNTAIN STONE CORPORATION

"Our BAY CITY Model 45 shovel with ¾-yard rock type dipper not only averages 800 to 1000 tons of blasted rock per 10-hour day in feeding the crusher, but it also sorts out stones weighing up to 6 tons for secondary blasting," says Mr. W. H. Peckham, President of Catskill Mountain Stone Corporation. BAY CITY doubled the daily production over a former light duty ¾-yard shovel, proving once again that for heavy duty work there's nothing like the tough, powerful BAY CITY. It has double dipper sticks, 3-part line, a 6-foot rotating path, helical cut gears, separate shafts and bearings for each hoist drum, and it is powered by a big 517 cubic inch Waukesha engine. These specifications compare favorably with many 1-yard shovels. Get complete information on the BAY CITY 45 from your BAY CITY dealer.

Write for these catalogs describing BAY CITY *Crawlers of ½ yards and up,* BAY CITY *CraneMobiles and CraneWagons in capacities to 25 tons.*



BAY CITY

BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

CALVIN L. DICKINSON has been appointed director of engineering at the Trona, Calif., works of the American Potash & Chemical Corporation, according to Parker S. Dunn, vice-president in charge of production.

HOWARD JACOBSEN has been promoted to district sales manager of the National Gypsum Company in Detroit. Mr. Jacobsen formerly was assistant district manager of sales in Chicago. He has been a salesman for the company's building materials since he joined it in 1947.

JOSEPH B. GILLENWATER, maintenance superintendent for the Standard Lime and Stone Company, was elected president of the George Washington Chapter of the West Virginia Society of Professional Engineers. RUSSELL H. DRUSCHEL, plant engineer for the Michigan Limestone Company was named vice-president.

Fred McComb, district engineer for the Portland Cement Association at Minneapolis, Minn. recently announced the appointment of LLOYD V. GUSTAFSON as information representative in Minneapolis.

W. A. James

J. L. Porter

JOHN L. PORTER has been appointed assistant director of the chemical research department of Kaiser Aluminum & Chemical Corporation. Dr. Porter had previously served as research group supervisor at Kaiser's Baton Rouge alumina plant since 1947.

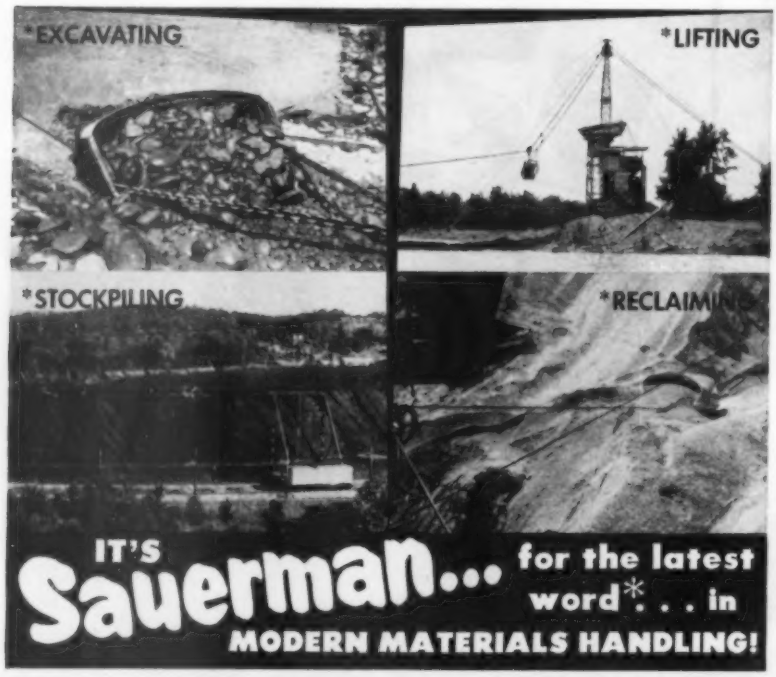
WILLIAM A. JAMES will succeed Dr. Porter at Baton Rouge. Dr. James was a research group leader for Aluminum Laboratory in Quebec for 10 years. He was later director of research for the Dearborn Chemical Company, Toronto, and joined Kaiser last year.

United States Gypsum Company has appointed three new sales supervisors in its industrial sales organization, it was announced by M. R. Druliner, general manager of the Industrial Division. H. M. SHOLOTA has been appointed for the Eastern Industrial District; R. L. KAMMER for the Southwestern Industrial District, and K. L. MICHEL for the Southeastern Industrial District. These are all newly-created posts.

Mr. Sholota, a graduate engineer of the University of Illinois, has been associated with U.S. Gypsum since 1949 as a sales correspondent in the Northwestern Industrial District; subsequently he was appointed sales engineer of that district. He was sales engineer of the Chicago Industrial District prior to his latest appointment, and will continue to make his headquarters in Chicago in his new position.

Mr. Kammer joined U. S. Gypsum as a correspondent in the Southwestern Industrial District in 1950. He was subsequently made chief clerk, and most recently was sales engineer of that district. He is a graduate in mechanical engineering of Purdue University. He will be located in Dallas, Tex.

Mr. Michel, who began with U.S.G. in the purchasing department in 1934, has been sales engineer in the Northwestern and Chicago Industrial Districts, and most recently was sales engineer of the Southeastern Industrial District.



Upper left: 4-cu. yd. Crescent Scraper excavating from a river bottom, brings in a load of stone with very few fines for a western sand and gravel company.

Lower left: 8-cu. yd. scraper machine is stockpiling 300 tons per hour, over an arc of 450 feet radius in a 225,000-sq. ft. storage area. Tail tower is remotely controlled from elevated cab above hopper.

Upper right: 2-cu. yd. Slackline Cableway lifts and conveys from an underwater deposit to a high hopper at the rate of 75 tph on an average haul of 450 feet.

Lower right: 2-cu. yd. Crescent working between a fixed head point and movable tail tower, reclaims phosphate from all points about the periphery of a roughly semi-circular storage area.

Sauerman systems are providing efficient, economical materials handling at installations throughout the world. Over large or small areas . . . indoors or out . . . on special or routine jobs.

Let Sauerman's skilled engineering staff develop a system best suited to your particular requirements. Send today for pertinent field reports and general catalogs in your field of materials handling.

SAUERMAN BROS., Inc.

534 S. Clinton St., Chicago 7, Ill.

ONE MAN MATERIALS HANDLING

SAUERMAN BROS., INC.

obituaries

FRANCIS G. MCCARTHY, a partner in the R. E. McCarthy & Sons Sand & Gravel Company, Syracuse, N.Y., died on October 4. He was a member of the Empire State Sand and Gravel and Ready-Mix Association.

J. BRYAN OLDHAM, 58, vice-president and manager of the Lone Star Cement Corporation's Texas division, died recently in Dallas, Tex.

Mr. Oldham joined the firm as a service engineer after graduating from the University of Texas. In 1942 he was appointed general manager of the concern in New York; and in 1946 he was named to the post he held at his death.

GEORGE W. JOHN, 59, vice-president and general manager of the Petoskey Portland Cement Company, died recently at Petoskey, Mich. Mr. John joined the concern when it was still constructing its plant in 1920 and served as foreman and later as superintendent before assuming the last position he held.

DEAN LOWRY, 44, assistant superintendent of the Monolith Portland Cement Company's plant at Monolith, Calif., was killed on September 26 in an automobile accident near Tehachapi, Calif. The driver of the car, A. P. Coate, received major injuries, but seven children riding in the station wagon were only slightly injured.

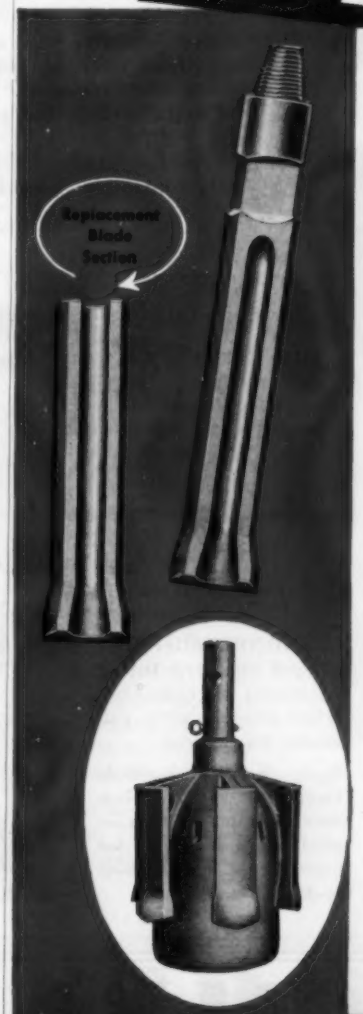
NICHOLAS V. DUNCAN, 59, Fairfield, Ill., died in Chicago recently after a prolonged illness. Mr. Duncan was formerly employed at the Oglesby plant of the Marquette Cement Mfg. Co. and later served in that company's sales department and executive branch in Chicago.

ARTHUR B. MACK, 70, director and executive vice-president of The Kelley Island Lime and Transport Company for many years, died on August 29 after an illness of only one day.

Mr. Mack was well known throughout the lime, stone, and railroad industries, in which he had spent almost all of his working life. As a young man he was auditor and general freight agent for the Lakeside and Marblehead Railroad Company, a subsidiary of The Kelley Island Lime and Transport Company. He joined the parent company in 1922 as assistant general manager and became an officer shortly thereafter.

When The Kelley Island Lime and Transport Company became the Kelley Island Company recently through a merger, he continued with the firm as executive vice-president and as a director. He was also a director of Cleveland Quarries Company.

SPANG



BLAST HOLE
BITS

Drill More Holes Per Bit, At Less Cost Per Hole

SPANG CHURN DRILL BITS, famous for long life and economy in the drilling of blast holes for the fragmentation of minerals or overburden, drill *more-holes-per-bit* at *less-cost-per-hole*, because they are fully heat-treated from end to end and have the *extra strength in pin and blade sections* to stand up under the toughest drilling conditions. They are made with semi-dressed ends for quicker, easier finish-dressing, in High Carbon, A.I.S.I. 4340, and Spang Molloy Steel.

Available also, as an added economy, are SPANG REPLACEMENT BLADE SECTIONS in the same grades of steel, and uniform forge section, for welding to pin and collar sections of original bits when long service has worn the integral blade to a point where replacement is desirable.

Anyway you look at it, SPANG BITS are your best buy for more holes at less cost per hole.

SPANG REAMER TYPE PILOT BITS FOR DRILLING LARGE DIAMETER HOLES

Can be supplied in all sizes and in any practical weight.

For information on SPANG BITS, and FREE CATALOG of Complete Line of SPANG Cable System Drilling and Fishing Tools, consult your nearest Dealer, or write direct to:

SPANG & COMPANY

DEPT. M-3 BUTLER, PENNSYLVANIA

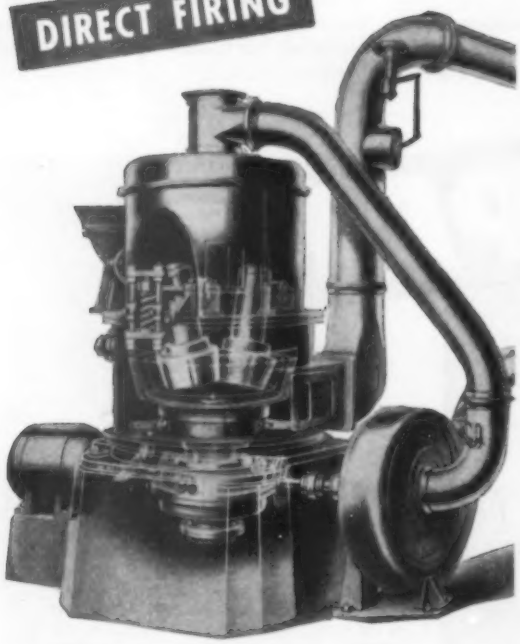
For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.

The HIGHER STANDARD

RAYMOND MILLS & SEPARATORS

FOR FINISH-GRINDING NON-METALLICS FOR DRYING AND GRINDING SIMULTANEOUSLY

DIRECT FIRING

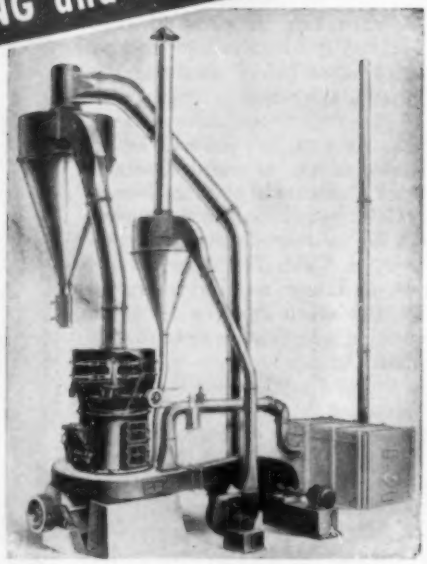


RAYMOND Bowl Mill . . . now in its 20th year of service to industry . . . is today's No. 1 unit for coal pulverizing and direct firing rotary kilns. Over 12 million tons of coal annually (rated capacity) are ground on Raymond Bowl Mills in the lime, cement and dolomite fields alone.

Bowl Mill Firing offers you new economies in plant operation and kiln efficiency. Ease of control, wide range capacity, high availability, ready response to any load changes, low operating and maintenance costs, are some of the many advantages that pay off in extra savings and plant output.

Write for details of this fully coordinated, automatically controlled direct-firing system.

DRYING and GRINDING



RAYMOND Roller Mill equipped with Flash Drying Accessories for removing surface moisture while pulverizing the material.

Highly efficient for handling limestone, gypsum, phosphate rock and similar non-metallics which can be fed direct to the mill without pre-drying.

LABORATORY PULVERIZING

RAYMOND "LAB" Mill is a compact motored unit for handling small capacities in test runs.

Bulletins ON REQUEST

COMBUSTION

RAYMOND DIVISION

FOR THE FINE GRINDING FIELD

CAPACITIES UP TO 30 TONS OR MORE PER HOUR. FINENESSES UP TO 99.9% PASSING 325 MESH AND FINER

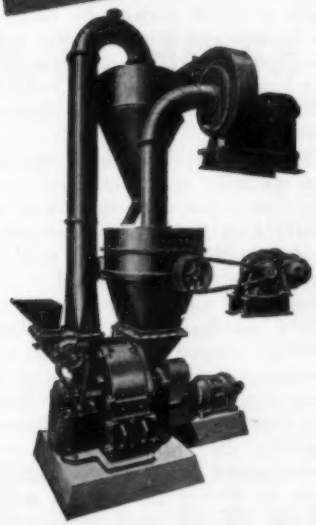
SUPERFINE PULVERIZING

RAYMOND Vertical Mill for producing powdered materials in sub-sieve particle sizes. It operates in a fineness range beyond that of ordinary pulverizers. Many products can be reduced to 95% to 99% finer than 15 to 20 microns. Some softer materials can be ground to 95% to 99% finer than 5 to 10 microns.

WHIZZER SEPARATION

RAYMOND Double Whizzer Mechanical Air Separator for fine classification of mill grind. Also made in Single Whizzer Type . . . and in sizes from 4 to 18 feet diameter, also in small laboratory units.

GRINDING and CLASSIFYING



RAYMOND Imp Mill with Whizzer Air Separator for finish grinding operations on a wide range of medium soft dry materials.

An efficient compact unit that handles the material automatically and dustlessly from feed hopper to finish bin.

Simple to operate . . . easy to control product . . . economical to install, operate and maintain.

ENGINEERING SERVICE

Our sixty-seven years' experience is available to you. Write us about your grinding problem and let us recommend the proper equipment to do your job.

FINE REDUCTION

RAYMOND Ray-Ducer for handling the softer non-abrasive materials.

ENGINEERING, INC.

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Sales Offices in Principal Cities

legal decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Selling Nonmetallic Products

Last month the writer just returned from rather extensive travels in the Eastern states. While on this trip I talked personally with numerous buyers, sellers, processors and producers of non-metallic products. Hence, I learned that many readers of PIT AND QUARRY have special legal problems involving particularly contracts made by agents and salesmen, and queries as to when such contracts are valid. For the benefit of readers I shall now explain various and all important phases of the law on this subject. The hereinafter higher court citations will assist readers to prepare to win unavoidable suits, and quite obviously readers will do well to clip and file away this article for future reference.

First, it is important to know that the legality of sale contracts for nonmetallic products made through representatives is a foremost present day legal subject. This is so because a great majority of litigations involving sale contracts arise from misunderstanding between a seller's agent and the purchaser, or the purchaser's agent and the seller.

The higher courts generally hold valid all contracts made by sales managers and purchasing agents, whereas contracts made by ordinary representatives and salesmen are not valid unless the complaining party proves that "legal representation" was authorized by the employer. Such proof, with respect to ordinary employees may be accomplished by testimony (1) that the employee was specially authorized to obligate his employer; or (2) in the past the employee's employer customarily accepted as valid all contracts made by the employee; or (3) the employer performed some act or made some statement which would have led reasonably prudent persons to believe that such employee actually was authorized to make valid contracts.

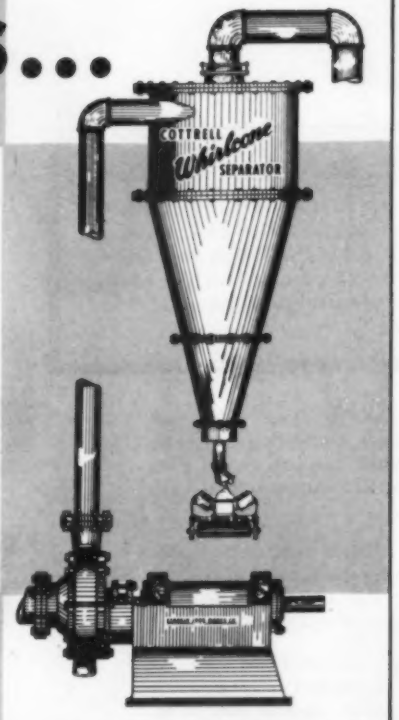
For example, in *Lippincot v. East River,* 141 N.Y.S. 220, the higher court said:

"One who deals with a special agent specially authorized for that transaction is put upon inquiry as to the extent of the agent's authority, and deals with him at the risk of his authority being exceeded. . . . Authority of an assumed agent to make a purchase will be implied where the alleged principal has repeatedly recognized and approved of similar acts; still a single act done under express authority is insufficient to justify the inference that the assumed agent has the apparent authority to subject the alleged principal to liability upon subsequent purchases made without actual authority."

Legal Authority of Salesmen

The lawful and usual legal right of an ordinary salesman to bind his employer on a contract of sale is well established by higher court decisions. All courts hold that an ordinary

Now You Can Recover Your Fines With This...



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Whirlcone
SEPARATOR
PAT. PENDING

Thousands of tons of valuable sand in the minus 50 mesh range are lost with wash water in Sand Plants all over the world. The well-known Cottrell Whirlcone Separator will save this sand at small cost.

COTTRELL ENGINEERING CO.
DIVISION OF
GIW
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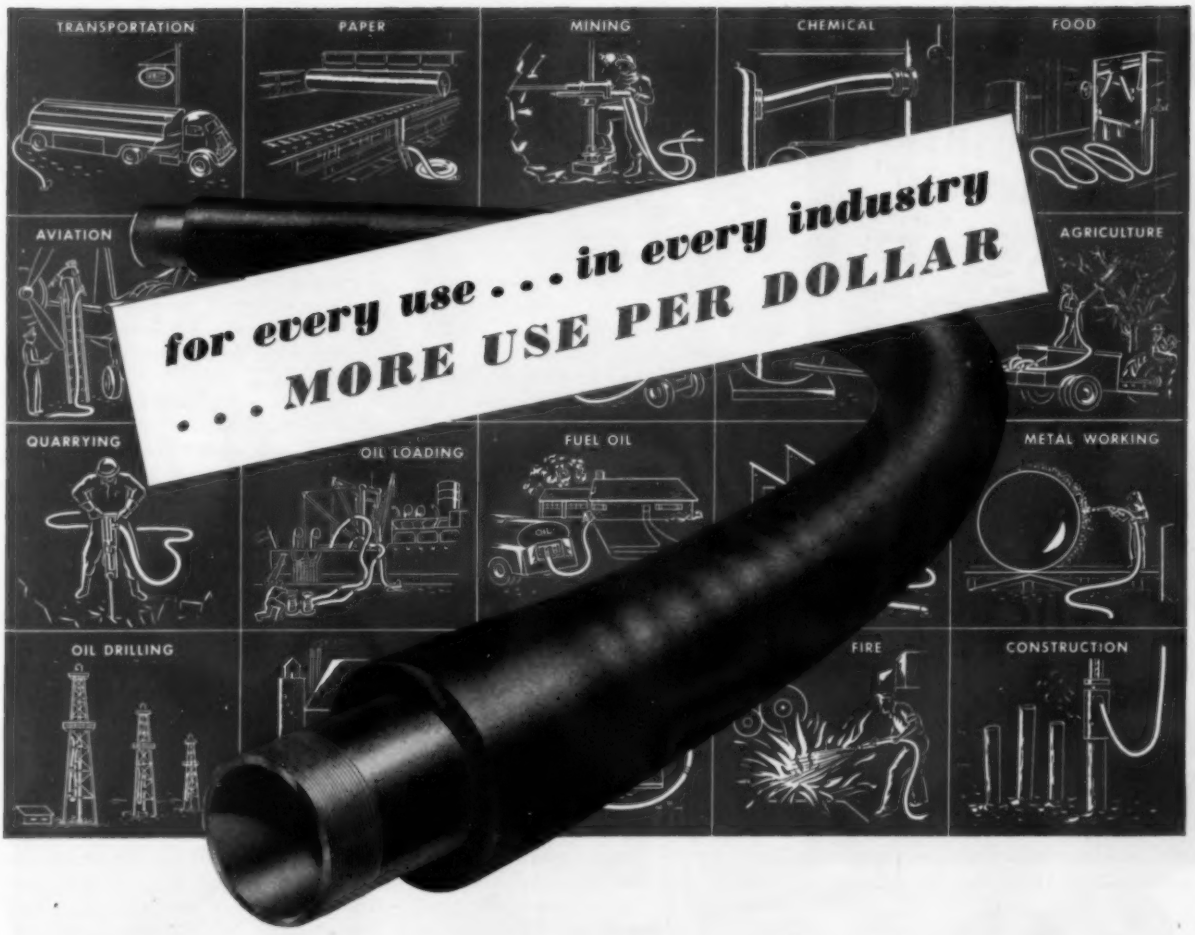
AUGUSTA, GEORGIA

The Whirlcone will de-slime and dewater these fines with approximately 95% efficiency in the plus 200 mesh range. There is a GIW Slurry Pump and a Cottrell Whirlcone Separator combination to fit any plant flow sheet. If you are losing fines, let us have your inquiry giving approximately the volume of flow and the nature of the losses. Our recommendations and literature will follow.

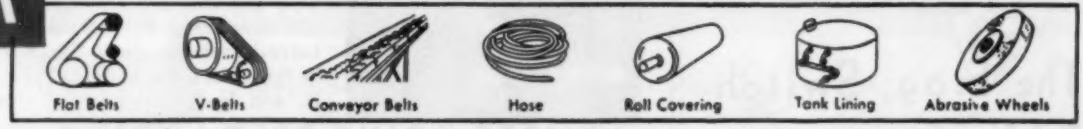


R/M HOSE

Raybestos-Manhattan makes the world's largest and strongest suction hose for conveying sand, water, oil, and sludge materials faster and more efficiently . . . at lower cost. R/M hose constructions range from ¼" paint spray hose to huge dredging hose big enough for a man to crawl through. Whatever your hose requirements – for handling air, water, steam, chemicals, gases and fluids of any kind – R/M hose will do your job better . . . because it's designed and engineered to last longer for each specific use. If you have a hose problem, Manhattan has the solution . . . over sixty years research and engineering experience assure you "More Use per Dollar" from every length you buy. You'll find the same is true of R/M conveyor belts, V-belts, flat transmission belts and other rubber products for your industry. Consult an R/M representative.

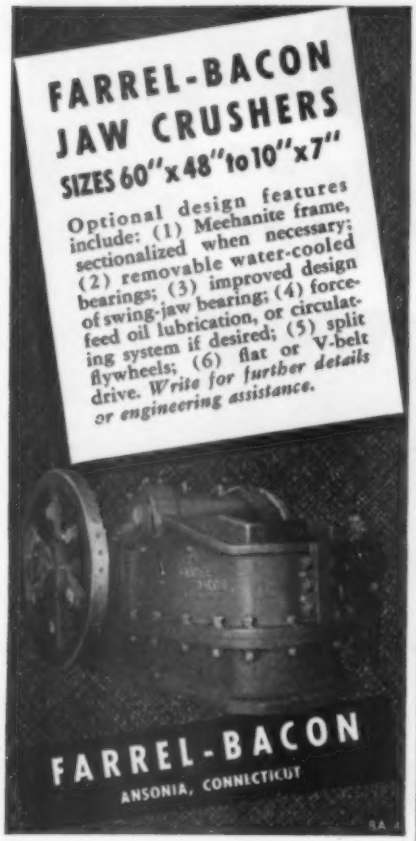
MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Bowling Balls

RM-410


FARREL-BACON
JAW CRUSHERS
SIZES 60"x48" to 10"x7"
Optional design features include: (1) Meehanite frame, sectionalized when necessary; (2) removable water-cooled bearings; (3) improved design of swing-jaw bearing; (4) force-feed oil lubrication, or circulating system if desired; (5) split flywheels; (6) flat or V-belt drive. Write for further details or engineering assistance.
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salesman has no authority to make a valid contract of sale without the special authority, approval or acceptance of his employer. In other words, the extent of an ordinary salesman's authority is to merely solicit orders and send them to his employer. And until the employer actually accepts the order sent by the salesman no valid contract exists, unless the testimony shows that the employer gave the salesman special and unusual authority to make valid contracts. For this reason, notwithstanding printed or written clauses in an order form, to the contrary, a purchaser may cancel the "order" any time before the salesman's employer accepts it. Also, the courts hold that when a notice of countermand is given by a purchaser to the same salesman who took the order, if such cancellation is given before acceptance of the order by the employer, it is the salesman's legal duty to cancel the order and communicate such notice to his employer, and his failure to do so will not result in a valid contract. (See 24 P. (2d) 384.)

On the other hand, any special agreement between a purchaser of non-metallic products and the salesman's employer is valid by which the salesman has been given "special" authority to make valid contracts binding on the employer. Under these latter circumstances the purchaser is obligated to fulfill the terms of the contract made with the salesman immediately upon signing.

An important question is: Is a valid contract completed where the salesman does not transmit all details of the complete agreement to his employer for acceptance, and as a result of this failure or neglect on the part of the salesman the employer accepts only part of the agreement?

For illustration, in the leading case of *Floor v. Mitchell*, 41 Pac. (2d) 281, the testimony shows facts as follows: A manufacturer's salesman entered into a sale contract in writing with a purchaser of non-metallic products. This sale contract was a printed form which contained clauses that the contract shall not be regarded as binding on the manufacturer until accepted by the manufacturer. Also, the contract stated that the salesman was not authorized to accept or make binding contracts for the manufacturer and that "it is understood" that the seller shall not be bound by any agreements or representations "not contained in this agreement".

Without knowledge or authority of the manufacturer, the salesman and the purchaser signed a secondary written agreement to the effect that the merchandise was guaranteed to "give satisfaction".

Both contracts were made in duplicate. The originals were retained by the manufacturer's salesman presumably to be sent to the manufacturer. However, the salesman did not send this secondary contract "guaranteeing satisfaction" to his employer but sent only the regular printed contract which later the manufacturer accepted by writing to the purchaser.

The purchaser was not satisfied with the quality of the materials and refused to make the agreed payments, directing attention of the manufacturer to the secondary written contract in which the salesman had "guaranteed" satisfaction.

The manufacturer filed suit against the purchaser and contended that the secondary agreement was without force or effect and not a part of the binding contract because the salesman had not sent it to the manufacturer, and it was not approved or accepted.

It is interesting to know that the higher court held that no valid contract existed and that the purchaser was not obligated to pay for the merchandise. The court said:

"The defendant (purchaser) made

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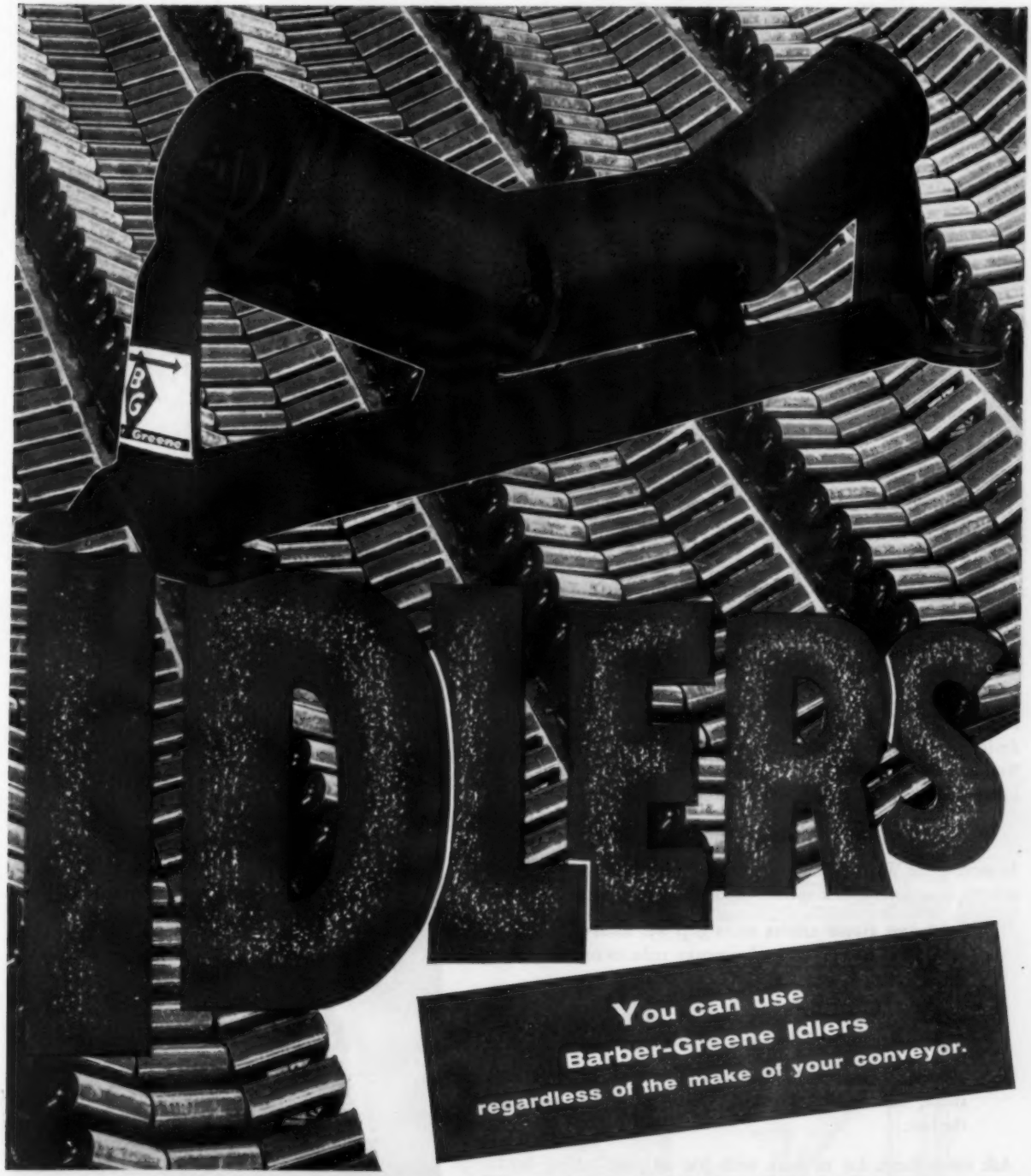

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an offer through an agent which consisted of two contemporaneously drawn instruments. The plaintiff's (manufacturer) agent failed to transmit one of the instruments. The principal, therefore, unknowingly accepted what it thought was the offer consisting only of the signed printed form. Since the offer of the defendant (purchaser) consisted of the two instruments failure to accept the whole of the offer was no acceptance at all."

In other words, this court held that if a salesman fails to send to his employer all written agreements signed by the purchaser, the salesman's employer cannot accept or approve the whole contract. Hence, no valid contract is made and neither the buyer nor seller is obligated by the terms of the complete, or any part, of the alleged contract.

Another important point of the established law is that an employer always is responsible for "fraud" of his agent when making a sale. Therefore, in the above case the court's decision would not have been the same if the court had decided that the salesman practiced fraud on the purchaser when making a secondary contract without knowledge of his employer. In other words, if the salesman had been guilty of fraud his employer would have been compelled by this court to fulfill the terms of both contracts.

No Compensation

A reader asked this question: "Can an employee who "wilfully" loses his job by voting any strike receive compensation under the State Unemployment Compensation Act?" According to a late higher court decision, the answer is no.

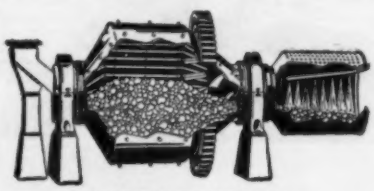
For example, in *Ford v. Abercrombie,* Ga., 62 S. E. (2d) 209, the Supreme Court denied the unemployment compensation claims of employees of a plant during the time the plant was closed for lack of materials due to a stoppage of work.

The higher court held that the employees of both plants were members of the same international union, and that in authorizing a strike in one plant, the union officers acted as the agents of all members and that the two plants were inseparable and together constituted "one establishment", as contemplated by the provisions of the Unemployment Compensation Law.

Must Call for Compensation Checks

Recently a higher court was asked to decide the question: "Can an injured employee receiving compensation payments from his employer, under the State Workmen's Compensation Act, be compelled to call at the employer's office for these checks?" The answer is yes.

For example, in *Maple v. American,* 39 So. (2d) 609, it was shown that an employee of the American Company injured his back when engaged in unloading materials from a boxcar. Controversy arose between the company and the employee over the proper amount of weekly compensation paid the employee under the State Workmen's Compensation Act. When the company sent the employee checks in payment of compensation, the employee refused to execute the receipts which the company required. Thereafter the company required that the employee call for his compensation checks, which he refused to do. The employee filed suit and asked the court to compel the company to send his compensation checks to him, and to pay interest on the amount of money represented by the checks he refused to call for at the company's office. The higher court refused to hold in favor of the employee, and said, "Under the circumstances, defendant (employer) was within its rights in demanding that he call for the checks. It follows that since these compensation payments were available to plaintiff (employee) had he called for them, no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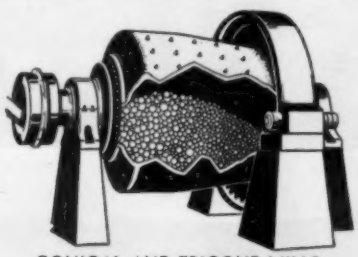
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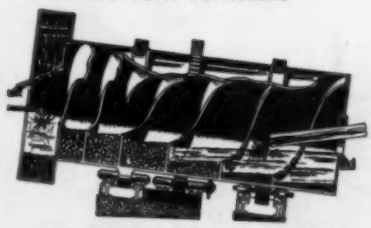
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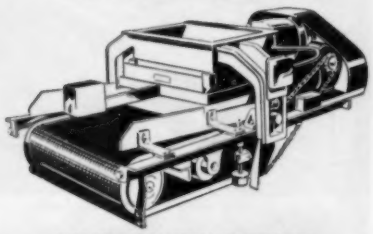
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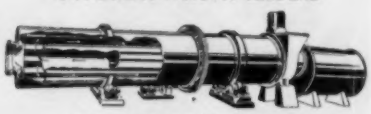
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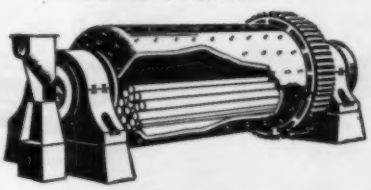
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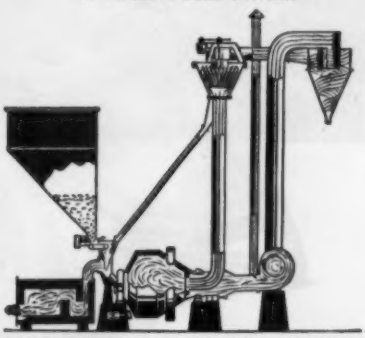
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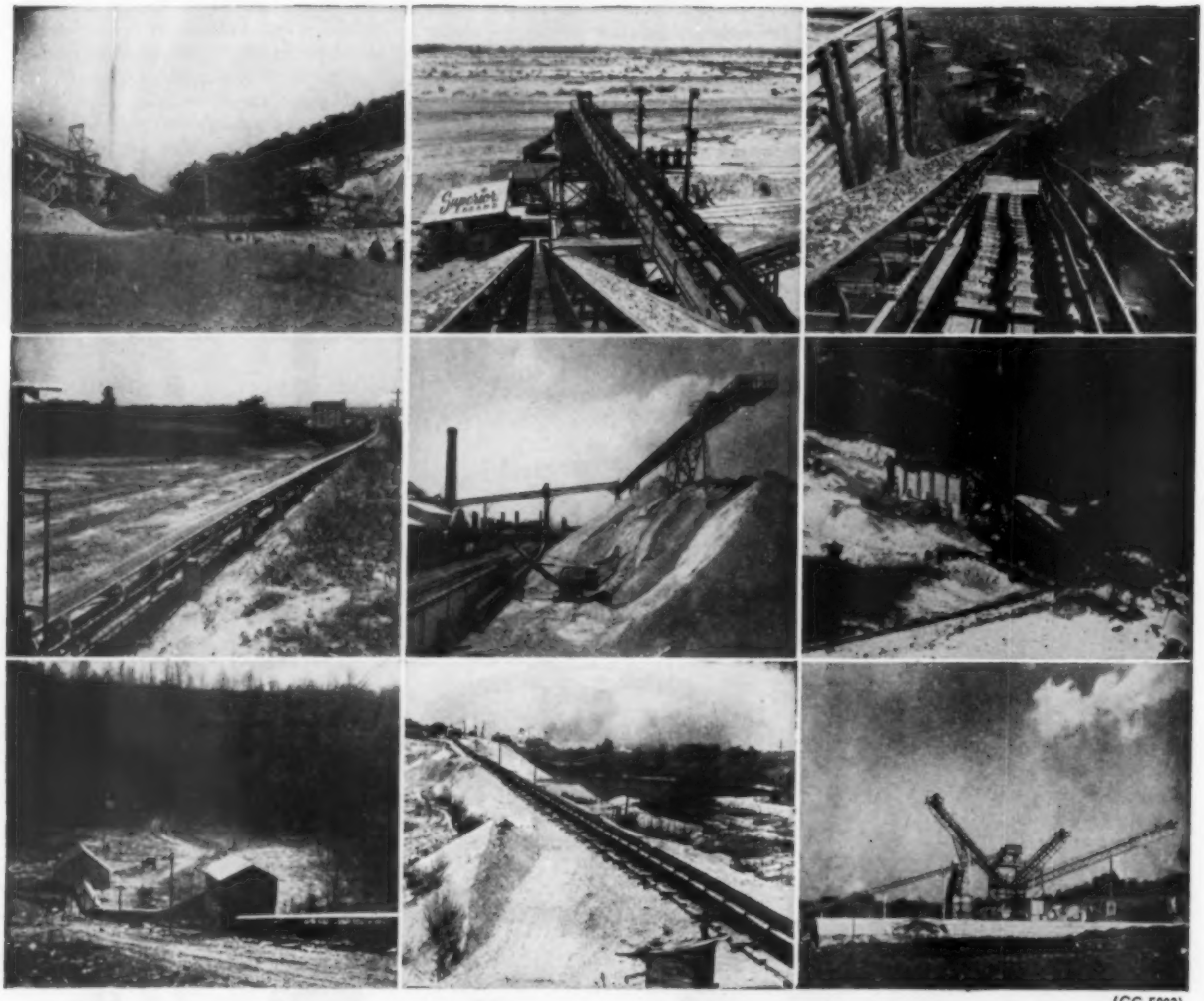

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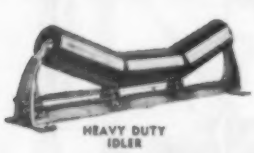

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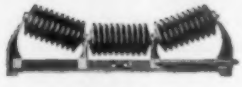

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Contracts with Salesmen

Modern higher courts consistently hold that ordinary contracts between salesmen and their employers are valid and effective, and must be construed according to legal rules applicable to other ordinary contracts.

For example, in the leading case of *Cole v. Industrial Company,* 157 S. E. 857, it was shown that a corporation engaged in selling nonmetallic products entered into a contract with a salesman by the terms of which the corporation agreed to pay the salesman stipulated commissions on all "sales accepted". Litigation developed between the corporation and the salesman when the former refused to pay the salesman commissions on certain orders which it had refused to accept and ship. The higher court held the salesman not entitled to receive payment on the orders "not accepted" by the corporation since the contract so specified. The higher court said:

"The parties understood, and so interpreted their agreement to mean, that commissions would be paid on all sales completed by deliveries and made on orders accepted by the defendant (corporation)."

For comparison see *Cole v. Industrial Fibre Company,* 157 S. E. 857. In this case it was shown that a man named Cole was appointed by a corporation through a written contract as "exclusive representative" for the sale of certain products in certain states for a period of eighteen months' with the privilege of renewal from year to year. The contract contained a clause that the corporation had the right to refuse "any or all orders". The contract, also, contained a clause that the corporation would pay to Cole stated commissions "on all net sales accepted" by the corporation which came from the specified territory.

Litigation developed over payment of commissions and Cole sued the corporation to recover payment on certain orders actually accepted by the corporation but which were cancelled by the purchasers before deliveries could be made. In indicating that the salesman was not entitled to recover these commissions, the court said:

"The interpretation or construction given contracts by the parties to them is one of the best indications of their true intent and meaning, and the courts should ordinarily enforce such construction. . . . The parties understood that commissions would be paid on all 'net sales', that is, sales completed by deliveries and made on orders accepted by the defendant (corporation) for the territory mentioned in the contract. . . ."

Hence, it is well established that contracts between salesmen and employers are construed by the higher courts in accordance with the exact wording and formulation of the contract. If the contract is ambiguous the court will seek to construe the obligations "intended" by the parties when the contract was signed.

General Agents Are Different

While, as above explained, an employer is not ordinarily liable on unaccepted contracts made by a salesman, and other "special" agents, the legal situation is different with respect to "general" agents, as sales managers, purchasing agents, and corporation's officials.

For example, in *B. B. Company v. Nesbitt,* 237 N. W. 586, the testimony showed facts as follows: A purchaser ordered from a manufacturer $12,000.00 worth of materials under a written contract which specified that delivery of the merchandise should be made "from six to nine months" after signing of the contract. Soon after the contract was signed the purchaser discovered that he would be unable to use the quantity of materials purchased in the written contract, and he consulted the manufacturer's sales manager. According to the testimony given by the purchaser the sales manager verbally agreed to extend the time in which the purchaser may accept delivery of the full quantity of merchandise specified in the contract.

Later the manufacturer sued the purchaser to recover heavy damages resulting from failure of the purchaser to accept delivery of the merchandise within the time specified in the original written contract. The manufacturer contended that the agreement made by the sales manager by which the terms of the written contract were varied was invalid because the sales manager had no authority to vary written contracts. However, it is interesting to observe that the higher court held the purchaser not liable on the contract, and said:

"The arrangement was made between the defendant (purchaser) and C., the sales manager of the plaintiff (manufacturer) for many years, whose authority was extensive. . . ."

For comparison see *Pollock Company v. Texas Lines, Inc.,* 201 S. W. (2d) 228. Here it was shown that a company received by mail a printing order for merchandise by G. H. Jones, "agent". An official of the company acknowledged this order by letter, whereby ordinarily a valid con-

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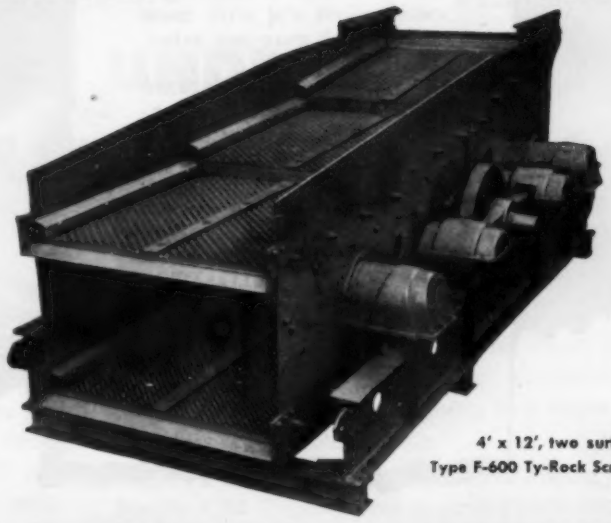

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GM DIESEL
CASE HISTORY NO. 5310-1X

OWNER: American Zinc Company, North Friends Station Mine, Mascot, Tenn.

INSTALLATION: GM 4-71 Diesels powering 3 Koehring Dumptors. Units haul 8¼ tons of rock and ore on 1100-foot run up 11½% grade to surface.

PERFORMANCE: GM Diesel-powered units help 20-man crew produce 500 tons of ore per day. Use of rubber-tired equipment cut cost of access shaft construction by 70%.

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to make trackless mining pay

One of the world's most efficient small underground mines, the American Zinc Company's new North Friends Station mine is proving the economy of trackless operation. With a fleet of three GM Diesel-powered Koehring Dumptors handling the haulage, the mine is producing 500 tons of ore per day—about 25 tons of ore per man-shift. Mine Foreman Bill Armstrong says: "These units run along month after month with almost no repairs. Our costs are much less than we expected."

General Motors 2-cycle Diesels are just as much at home underground as on the surface. Two-cycle operation with uniflow blower scavenging gives more complete combustion of low-cost fuel for higher efficiency and cleaner exhaust. Used with exhaust scrubbers and adequate ventilation, mine air stays well within permissable limits. And two-cycle operation means faster acceleration, quicker response to controls, faster haul cycles for increased production.

There's a GM Diesel for every kind of mining job. Specify GM Diesel power in *your* equipment. It will save you money.

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tract would have been completed.

The company refused to pay the bill of $1,594.00 on the contention that Jones was not authorized to act as its legal purchasing agent to purchase supplies. The company filed suit and proved that Jones was his employer's authorized purchasing agent, and had been for several months purchasing supplies in the regular course of the business.

In view of this testimony the lower court concluded that G. H. Jones was impliedly authorized to purchase the supplies in question. The higher court approved the verdict saying:

"The authority of Jones to make the purchase was expressly vested or might be reasonably inferred from the power conferred upon him to buy supplies of the character actually purchased."

Implied Authority

All higher courts agree that a "general agent" has implied powers to make valid and binding contracts. This is so particularly with respect to the president of a corporation.

For illustration, in *Diederich v. Wisconsin Products, Inc.*, 19 N. W. (2d) 268, it was shown that a corporation's directors voted against making a written contract to sell nonmetallic products to a purchaser. However, the corporation's president signed a contract with a purchaser for shipment of a specified quantity of the products.

In subsequent litigation, it was contended that the contract was illegal because it was signed by the corporation's president knowing that the corporation's directors had voted against making the contract. Nevertheless, the higher court held the contract valid, and said:

"A president who is also general manager of a corporation has the implied power to do anything that the corporation could do within the general scope of its business. . . ."

Kaiser Gypsum Constructing West's First Retarder Plant

Construction has begun on the $110,000 plaster retarder plant of the Kaiser Gypsum Company adjacent to the firm's Long Beach (Calif.) gypsum products plant.

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Traffic News

PACIFIC SOUTHCOAST FREIGHT BUREAU

Docket 5193 (S) — Proposed to establish on stone, that is, rock, crushed, carloads, from Douglas, Ariz., to the following points:

Brawley, El Centro, Palm Springs, San Diego, Calif.	20 cents
Mesa, Phoenix, Yuma, Tucson, Ariz.	12½ cents
Deming, N. M., and El Paso, Tex.	14 cents
Roswell, N. M.	20 cents

Above rates not subject to X-175 increase.

Docket 5015 R/O (S)—Proposed to request rates on carloads of gypsum from Gerlach, Nev., to California points: Walnut Creek and Danville, 19½ cents; San Ramon and Dougherty, 20½ cents; Hollister and Davenport, 21½ cents. Rates subject to X-166-168-75 increases.

WEEKLY DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION PROPOSALS

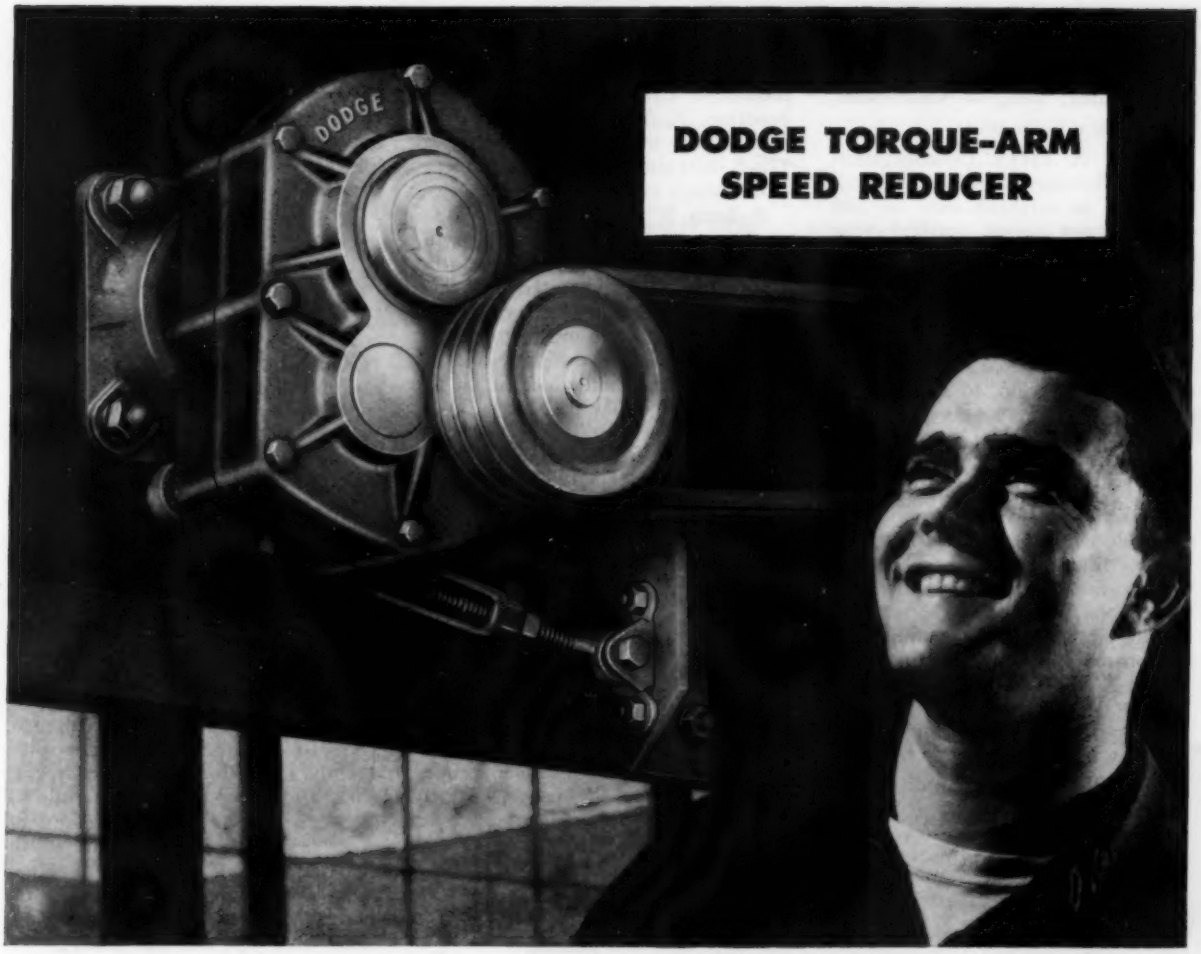
Docket A 19477 (c)—Proposed to establish a rate of 457 cents per net ton on limestone, ground or pulverized, in box cars, protected by tarpaulin or other protective covering. Minimum weight of car 30 tons, from Cartersville, Ga., to Dayton, Ohio.

Docket A 19480 (c)—Proposed to establish a rate of 394 cents per net ton on lime in 25-ton minimum carloads. Described in item 518 Southern Freight Tariff Bureau 382-F from Reddick to Cosme, Fla.

Docket A 19237-1 — Proposed to establish rates from Mt. Airy, N. C., of 547 cents per net ton and from Rockton, N. C., 536 cents net ton to St. Louis, Mo., on stone, crushed in closed cars. 40-ton carload, except that when loaded to full visible capacity, actual weight will apply. When loaded less than full visible capacity of car, marked capacity of car will apply.

Docket A 13107 (Southwestern Freight Bureau Proposal 69450)—Proposed to establish on magnesite, calcined or dead burned, from Loving, N. M., to eastern points, representative points being Amcelle, Md., 71 cents; Baltimore, Md., 73 cents; Corning, N. Y., 72 cents; Akron, Ohio, 75 cents; and Butler, Pa., 68 cents net ton.

Docket A 13108 (Southwestern Freight Bureau Proposal 69467)—Proposed to establish a rate of 1003



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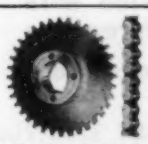

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cents net ton on roasted dolomite, carload minimum weight 90 percent of marked capacity of car, from Dolly Siding, Mo., to Charleston, S. C.

Docket A 13114 (Southwestern Freight Bureau Proposal 69560)—Proposed to establish rate of 388 cents per net ton on crushed stone from Butterfield, Ark., to Ensley, Ala.

Docket A 13120—Proposed to establish a rate of 61 cents, on roasted dolomite, carloads of 50 tons, from Martin, Ohio, to Rio Grande Crossings.

TEXAS-LOUISIANA FREIGHT BUREAU

Docket 13997-TX—Proposed to establish a rate of 148 cents per net ton on limestone, crushed, Strawn to Lone Star. This rate applies only on crushed limestone to be used for fluxing purposes in the manufacture of iron and steel articles. It is subject to X-175 TLT 84-F (6%).

TRUNK LINE TERRITORY RAILROADS

Freight Traffic Committee

Bulletin N 4611 M-25 (Shipper)—Proposed to issue a rate on crushed stone and screenings in straight or mixed carloads, in bulk, open-top cars, minimum weight 90 percent of marked capacity of car from Union Furnace, Pa., to Barnesboro, Pa., $1.11 per net ton and to Reynoldsville, Pa., $1.77 per net ton. These rates are subject to X-Parte 175-B increase and are issued to meet motor truck competition. They will not apply on agricultural limestone or ground limestone, unburned, fluxing stone, firestone or stone coated with any bituminous materials.

Bulletin N 46110M-26—Proposed to issue a rate of $1.60 per net ton on stone, natural (other than bituminous asphalt rock) crushed, in open-top cars not protected by a protective covering from Prospect Junction, N. Y., to Gabriels, N. Y. This rate is not subject to ExParte 175-B increase and is issued to meet motor truck competition.

Bulletin N 4609-10—Proposed to establish a rate on limestone, natural, ground or pulverized, in open-top equipment, not protected by tarpaulin or other protective covering, minimum weight 45 tons, from Oriskany Falls, N. Y., to Sidney, N. Y., $1.50; to Walton and Cadosia, N. Y., $1.68; and to Delhi, N. Y., $1.75 per net ton. These rates are not subject to ExParte 175-B increase.

Bulletin N 4611 M-28 (Carrier)—Proposed to establish a rate of $1.77 per net ton on crushed stone, in open cars not protected by tarpaulin or other protective covering, carload minimum weight 90 percent of marked capacity of car from Aggregates, W. Va., to Heaters, W. Va. Rate is not subject to ExParte 175-B increase.

Bulletin N 4609-11 (Shipper)—Proposed to establish a rate of $1.94 per gross ton on limestone, crude, fluxing, foundry or furnace, in open cars, carloads, minimum weight 90 percent of marked capacity of car from White Pigment Corp. Siding and Thomasville, Pa., to Fairless, Pa. Rate is subject to ExParte 175-B increase.

Bulletin N 4611-30 (Carrier)—Proposed to establish a rate on crushed stone, carload minimum weight 90 percent of marked capacity of car from Lone Star, Va., to Norfolk, Va., $2.10 per net ton in open-top cars and $2.44 per net ton in closed cars. Rates not subject to ExParte 175-B increase.

Bulletin N 4614 M-35 (Shipper)—Proposed to establish on slag, taking group letter F per Lehigh Valley Railroad tariff 45, ICC-C9250 carload minimum weight 90 percent of marked capacity of car from Easton, Pa., to Dover, Wharton, Lake Hopatcong, Port Morris, Netcong, Hackettstown, Port Murray, Washington, Broadway, New Village, and Stewartsville, N. J., $1.25 per net ton. This rate is subject to ExParte 175-B increase.

WESTERN TRUNK LINE COMMITTEE

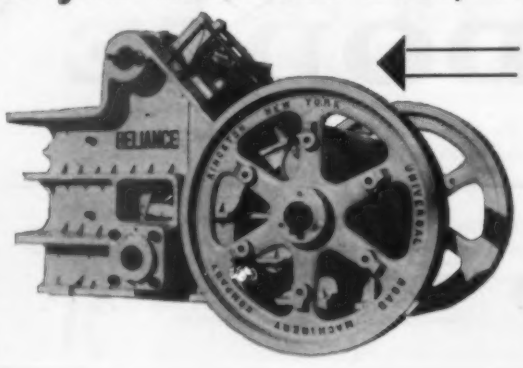
Docket E-41-2101 (S)—Proposed to establish a rate on perlite rock, broken, crushed or ground, dried or not dried, not expanded, carloads, from Socorro, N. M., to the following points: Lake Zurich, Ill., $7.74 per net ton; Appleton, Wis., $7.96; and Milwaukee, Wis., $7.96. These rates are subject to X-175-B increase.

Docket X-D-25-420 (C)—Proposed to establish a rate of 20 cents per hundredweight on lime, minimum weight 30 tons, from Menominee, Mich., to White Pine, Mich. Rate subject to X-175-B increase; will alternate with present rate.

Docket D-25-302 (S)—Proposed to establish through one-factor rates on lime from Mosher-Ste. Genevieve, Mo., and other producing points to Western Trunk Line destinations in western Minnesota, North and South Dakota, on basis of the so-called Scale B minimum 15 tons; rates, 80 percent thereof, minimum 25 tons. This rate applies on straight or mixed carloads.

Docket E-41-1844 (S)—Proposed to establish rates on silica sand, carloads, as described in Column A and C. Item 25-B, Supplement 31, Western Trunk Line Tariff, 41-B Alt. Agt. Henning's ICC A 3718, from Clayton, Iowa, to Zanesville, Ohio, Lancaster, N. Y., and Washington, Pa., to Lancaster, N. Y., 452; to Washington, Pa., 441; and to Zanesville, Ohio, 408. Rates are subject to ExParte 168-175 increases.

If you want the best, choose RELIANCE



Heavy Duty **CRUSHERS**

GREATER WEIGHT MORE STABILITY

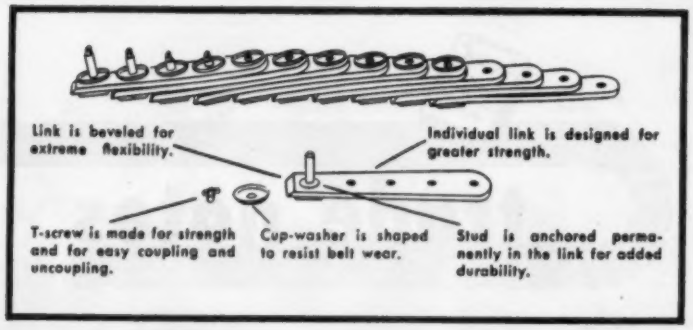
Built to give life-time service with low-cost operation and maintenance

Crushing, Screening and washing plants from 50 to 1500 tons per day capacity.

Our BULLETIN has full details

UNIVERSAL ROAD MACHINERY CO., Kingston, N.Y.

This detailed line drawing of the new Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job . . . easier!


Link is beveled for extreme flexibility.
Individual link is designed for greater strength.
T-screw is made for strength and for easy coupling and uncoupling.
Cup-washer is shaped to resist belt wear.
Stud is anchored permanently in the link for added durability.

New VEELOS

TD and TE Adjustable V-Belt for D and E drives

▶ *easy* to couple and install

▶ does a *better* job for a *longer* time

THE NEW VEELOS TD AND TE adjustable v-belt was developed *specifically* for D and E drives. It's not just an adaptation, it's an entirely new patented v-belt design!

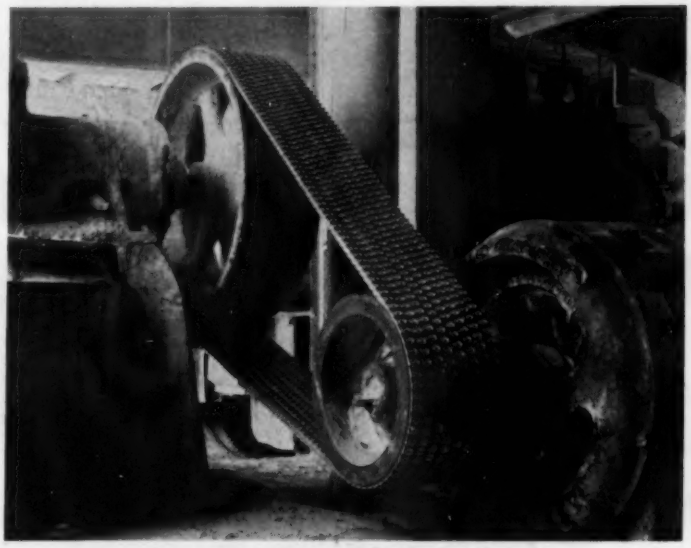
New Veelos TD and TE v-belt is faster and *easier* to install. Cup-washers and T-screws join links together to make up individual belts—and you don't need to remove outboard bearings.

New Veelos TD and TE v-belt lasts longer. Advanced construction of stud, cup-washer and T-screw provides added strength and durability—protects the new high-tensile strength link.

New Veelos TD and TE v-belt is perfectly balanced. Machine-cut sides and uniform links provide smooth, vibrationless, full-power delivery.

Put the new Veelos TD and TE v-belt on your D and E drives . . . prove to yourself that this v-belt does a better job for a longer time!

Get the complete story of this great, new v-belt. Send coupon for new 8-page illustrated bulletin.



MANHEIM MANUFACTURING & BELTING CO.
654 Manbel St., Manheim, Pa.

Please send copy of your new Veelos TD and TE v-belt catalog.

Name .....

Company .....

Address .....

.....

Veelos is known as Veelink outside the United States.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH

ADAPTABLE TO ANY DRIVE

72

trade notes

Charles G. Stradella, president of General Motors Acceptance Corp., has been elected to the board of directors of General Motors Corp., succeeding John J. Schumann Jr., who has retired.

St. Regis Paper Co., New York, N. Y., announces the appointment of Harry A. Hughes, vice-president of St. Regis Sales Corp., its sales subsidiary, as assistant general sales manager of the Multiwall Packaging Division.

Also announced is the appointment of Howard C. Peterson Jr., vice-president of St. Regis Sales Corp., as eastern district sales manager of the Multiwall Packaging Division. In this position, Mr. Peterson succeeds Mr. Hughes.

Baldwin - Lima - Hamilton Corp., Construction Equipment Division, Lima, Ohio, announces the appointment of two new distributors.

R. S. Armstrong & Bros. Co., of Albany, 300 South Slappey Drive, Albany, Ga., has been named distributor covering the southern portion of Georgia.

The distributorship for the northern portion of Texas has been assigned to Fred Berryhill Equipment Co., Inc., P.O. Box 8, Plainview Cut-off Rd., Lubbock, Texas.

Leon W. Fisk has been appointed sales manager of The Spencer Manufacturing Company of Ohio. He will headquarter at the organization's executive offices in the Keith Bldg., Cleveland.

The Raymond Bag Co., Middletown, Ohio, has announced the appointment of two new members to its Chicago district office sales organization.

W. Ray Raleigh, with over 14 years experience in the industrial packaging field, will handle Raymond sales for a portion of Chicago and the remainder of Illinois.

E. H. Pyle, who has been engaged in multiwall paper sack sales for 25 years, will also represent Raymond in a portion of Chicago and Wisconsin.

Edward R. Anderson has been elected a vice-president of American Brake Shoe Co., New York, N. Y. He will continue as president of the AmForge Division of the company.

The National Bearing Division of American Brake Shoe Company has announced the appointments of Norman Birch as vice-president in charge of operations, I. Eugene Cox as vice-president in charge of engineering and development, and Bernard Esarey as works manager in the Meadville, Pa., plant.

L. A. DePolis has been appointed general sales manager of the Industrial Truck Division of Clark Equipment Co., Battle Creek, Mich.

Mr. DePolis was formerly sales manager for Ross Carrier Co. When Ross was acquired by Clark last year, he became assistant to the vice-president in charge of industrial truck sales.

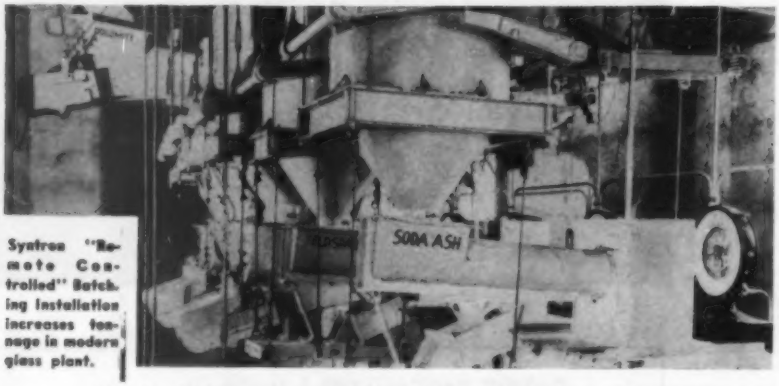
L. A. De Polis

Peter C. Friend

Peter C. Friend, sales engineer, has been transferred to the San Francisco district office of the Crusher Division, Nordberg Manufacturing Co., Milwaukee, Wis. In his new assignment he will assist T. D. Davis, western branch manager.

Joining Nordberg in 1947, Mr. Friend was initially assigned to the production department, first in manufacturing and later in production control. Transferred to the Crusher Division in 1952, he was named sales engineer in 1953, covering the Milwaukee territory.

BATCH WEIGH PLANTS
by SYNTRON



Syntron "Remote Controlled" Batching Installation increases tonnage in modern glass plant.

- **Push Button Controlled, Multiple Batching**
- **Automatic Operation Reduces Handling Costs**
- **Complete Accuracy Without Constant Attention**

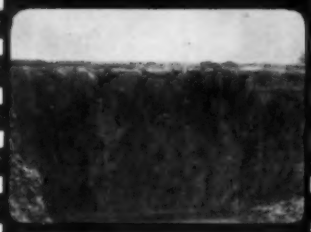
Electromagnetically operated, without gears, cams, belts, etc., Syntron Feeders are perfectly suited for Mulitple Batching Installations. "Push-button" controls permit one man operation of a complete Batch Weighing Plant. Accurate, automatic, multiple batches that meet production requirements.

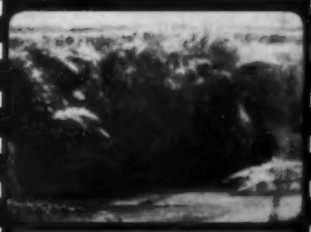
Write for complete catalog data — Free

SYNTRON COMPANY
385 Carson Avenue Homer City, Penna.

The INSIDE STORY

A MOTION PICTURE DISCUSSING THE PRINCIPLES OF BLAST DETONATION





New Atlas Movie Shows Advanced Blasting Techniques

THE NEW Atlas movie "The Inside Story," is a technical discussion of blasting methods used in quarries, strippings and construction work. It shows what happens between the firing of the cap and the blast of the explosives column. It shows how point of detonation affects rock movement . . . the most effective use of millisecond delays . . . the difference in action between progressive and alternate patterns . . . alternate velocity loading and what this new method will do toward refining millisecond delay blasting.

To get "The Inside Story" for your organization, simply write to the nearest Atlas office listed at right or to our home office. Let us know approximately when you will want it, the type of meeting you are planning and we will be glad to work out the arrangements at no cost to you.

BRANCH OFFICES

135 So. LaSalle St., Chicago 3, Ill. *Franklin 2-9530*

60 East 42nd Street, New York 17, New York *Vanderbilt 6-1730*

First National Bank Bldg. Tamaqua, Pa. *Tamaqua 1300*

No. 1 Montgomery Street San Francisco 4, California *Garfield 1-8640*

Joplin National Bank Building Joplin, Missouri *Joplin 924*

Hamilton National Bank Building Knoxville 3, Tennessee *Knoxville 2-2147*

Smithfield and Oliver Streets Oliver Bldg., Pittsburgh 22, Penna. *Atlantic 1-2684*

1320 Joseph Vance Building Seattle 1, Wash. *Main 5110*

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

Ernest H. Heath Jr. has been appointed sales manager of the newly-created Flexible Packaging Division, Arkell & Smiths, manufacturers of multiwall paper bags and specialty bags. The division was formed within the company to handle the output of a recently-acquired plant at Hudson Falls, N. Y.

The following new members were elected to the board of directors of Hercules Powder Co., Wilmington, Del.: L. W. Babcock, director of personnel; John E. Goodman, treasurer; Ernest S. Wilson, director of engineering.

Edwin S. Ladley, former assistant director of purchases, has been appointed director of purchases, succeeding Lawrence J. Finnan Jr., who will retire at the end of the year upon completion of 40 years of service.

Operated formerly as a service branch of Florida Diesel Engine Sales, a factory branch of Detroit Engine Division of General Motors, Southern Diesel Sales of 529 Palm Beach Blvd., will now be the Ft. Myers, Fla., dealer for GM diesels. Southern Diesel Sales will be under the sole ownership and management of Roy T. Sorrell Jr.

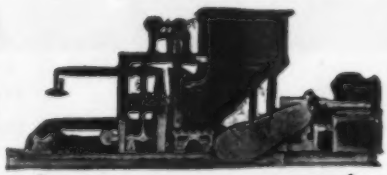
A 193-ton steam drum, built by The Babcock & Wilcox Co., at its Barberton, Ohio, plant, required three railroad flat cars for its trip to Detroit, Mich. The drum will become part of the largest single boiler ever built in the world. The giant B&W boiler, which will reach 15 stories in height when erected, will supply steam for the first two turbine generating units to be installed at the River Rouge power plant of The Detroit Edison Co.

Worthington Corp., Harrison, N. J., announces the appointment of the following new distributors to handle the corporation's construction equipment line: Jackson Machinery Co., Inc., of New Orleans, La.; The Heil Co. of New York, Inc., Astoria, Long Island; Hunter Tractor & Machinery Co., Milwaukee, Wis.; Pecaut Industrial Supply Co., Sioux City, Iowa.

Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., has announced the appointment of Howell-Lanier Engineering Sales, 4703 Ritchie Highway, Baltimore, Md., as metropolitan Baltimore distributor for Manhattan industrial rubber products.

TOPS 'EM ALL for SCALING

OVER 1300 now serving Industry



Write for CATALOG No. 5

SCHAFFER POIDOMETERS

are standard machines around the world for producers of raw and finished bulk materials.

Automatic, fast, and extremely accurate, Poidometers provide dependable data for all scaling functions, including weighing, blending, feeding, mixing, recording, and proportioning.

Poidometers boost output and profits, and improve product uniformity. They give an outstanding performance for continuous, high-economy operation under all working conditions.

Available with remote control weighing and recording devices, and total weight recorders.

SCHAFFER POIDOMETER CO. 2828 Smallman Ave., Pittsburgh 22, Pa.

Felix Sweeney has been appointed sales manager of the Wayne Crane Division, American Steel Dredge Co., Inc., Fort Wayne, Ind. Prior to this appointment, he was eastern district sales representative, and before that represented Wayne Crane in the Midwest district.

Felix Sweeney

S. M. Spencer

S. M. Spencer, supervisor of textile bag sales for Bemis Bro. Bag Co., St. Louis, Mo., has been appointed assistant manager of the company's St. Louis plant and sales division. He will be succeeded as supervisor of textile bag sales by W. J. Ray, who has been acting as assistant.

Mr. Spencer joined Bemis at St. Louis in 1937 and engages in sales promotion of open-mesh bags, which were then in their pioneering days. He was put in charge of the company's Oklahoma City sales office in 1940. In 1948 he was made supervisor of open-mesh bag sales, and became supervisor of textile bag sales in 1951.

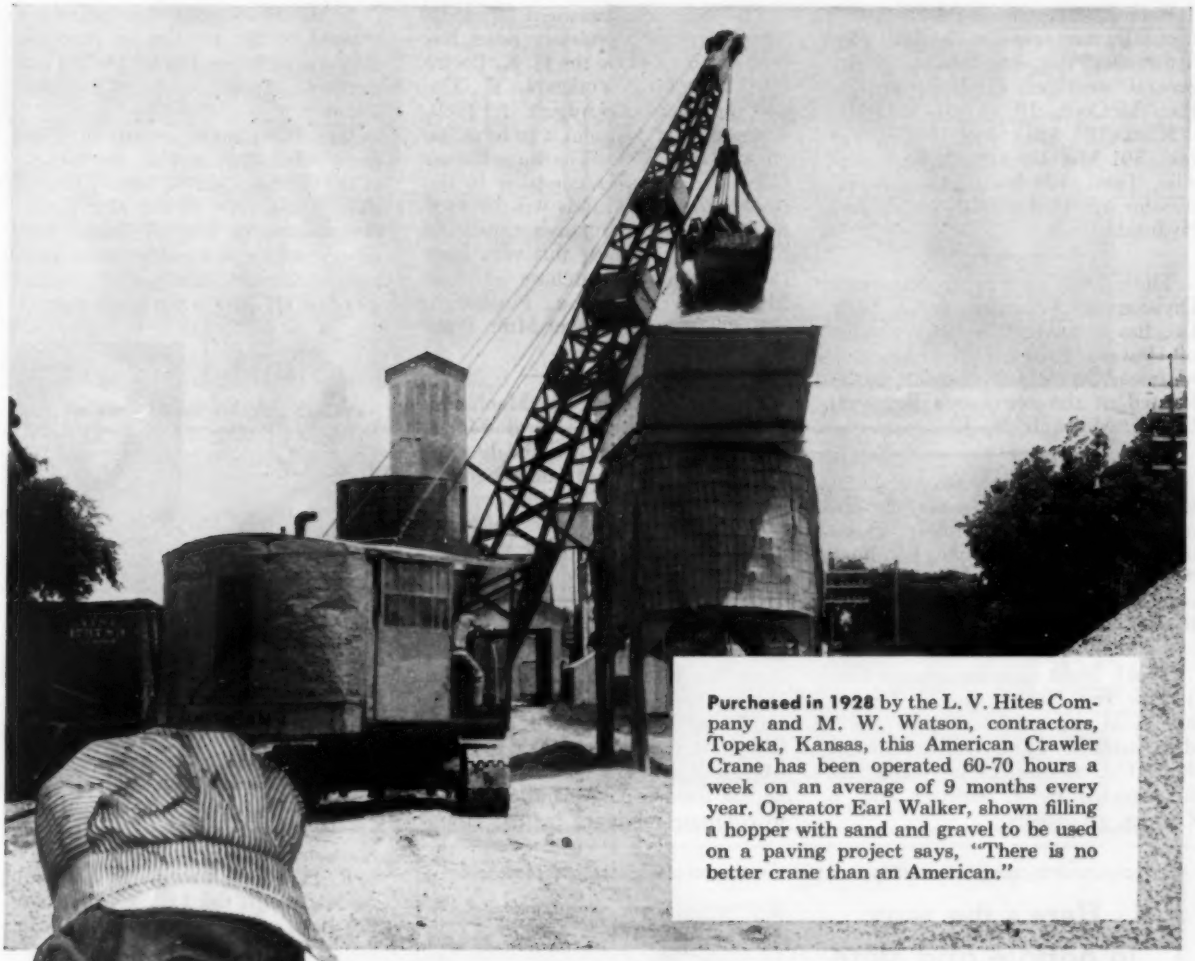
Harold W. Spangler has been named secretary-treasurer of the Hoyt Wire Cloth Co., Lancaster, Pa., manufacturers of aggregate wire screens.

Mr. Spangler has been with Hoyt since December, 1952, soon after its start in this business.

Harold W. Spangler

William D. Baker

The Baughman Manufacturing Co., of Jerseyville, Ill., has announced the appointment of William D. Baker to the position of purchasing agent. Mr. Baker, who resides in Jerseyville, has held the job of parts manager for the last two and a half years.



Purchased in 1928 by the L. V. Hites Company and M. W. Watson, contractors, Topeka, Kansas, this American Crawler Crane has been operated 60-70 hours a week on an average of 9 months every year. Operator Earl Walker, shown filling a hopper with sand and gravel to be used on a paving project says, "There is no better crane than an American."

More than 60,000 production hours on an American Crane purchased in 1928

"And there is no better crane made," says veteran Kansas operator.

Today American STILL leads the field!

Whether your American Crane has been on the job for 26 years or was just delivered, it adds extra profit-production hours to the day. It delivers big capacity and fast, smooth operation with less maintenance required than anything else in the field.

Compare the American Cranes, feature by feature, with any other crane. They are built by a company with ¾ of a century experience in manufacturing the finest hoisting equipment.

American Hoist

American Hoist & Derrick Co. **St. Paul, Minn.**

Today's Leader. The American 700 Series . . . 50-ton Lifting Crane . . . 1½ yard rock shovel and backhoe . . . 2 yards as a clamshell or dragline. The newest member of the American line.

Roland Karste, former Detroit district sales manager for The Heil Co., Milwaukee, Wis., has been appointed general manager of Heil-Chicago, Inc., McCook, Ill.

Knoxville Structural Steel Co., Inc., 301 Morelia Ave., N.E., Knoxville, Tenn., has been named a distributor of Heil truck bodies and Hydraulic hoists.

The newly-organized Sintermet Division of American Brake Shoe Co., has announced the appointment of Howard B. Huntress as director of research. He will continue to be located at the company's Research Center, Mahwah, N. J.

The Brinker Supply Co., of Pittsburgh, Pa., and the Stewart Equipment Co., Inc., of Harrisburg, Philadelphia, and Wilkes-Barre, Pa., have been appointed dealers by the Highway Equipment Co., Inc., Cedar Rapids, Iowa.

Truck Hoist and Equipment Co., 1409 — 2nd Street South, Minneapolis, Minn., has been appointed a distributor by The Galion Allsteel Body Co., Galion, Ohio. Sales will be directed by J. Shertzer and J. Cooper, co-owners.

The private placement of $13,000,000 of its promissory notes has been announced by the H. K. Porter Co., Inc., New York, N. Y. The notes mature on August 1, 1969, while the first payment is to be made on August 1, 1955. The First Boston Corp. acted for the company in the transaction. The funds will be used to further the company's expansion plans, which already this year have resulted in the purchase of The McLain Fire Brick Co., Pittsburgh, Pa., and Pioneer Rubber Mills, Pittsburg, Calif.

Enterprise Engine & Machinery Co., subsidiary of General Metals Corp., San Francisco, Calif., has announced a change of address for its Chicago office. The new office, continuing under the direction of Wren Malone, is located at 1737 W. Howard Street, Room 211.

Robert I. Sutter will represent The Hammond Bag & Paper Co., Wellsburg, W. Va., in the Ohio territory. He has been in Multiwall bag sales for 25 years and is well known to the trade throughout Ohio and the Middle West. For the last ten years he has lived in Cleveland and plans to continue residence in that city.

J. W. Bloomquist has been appointed to the position of domestic sales manager for Euclid Division of General Motors Corp., Cleveland, Ohio.

Mr. Bloomquist returns to the home office after serving as manager of the Hibbing, Minn., factory branch since 1950. He joined the Euclid organization in 1945 as district sales representative and was assistant manager of domestic sales prior to assignment as Hibbing branch manager.

J. W. Bloomquist

Frank L. Harris

Frank L. Harris, former sales representative in the Chicago territory, has been selected to head the new regional office of the Marine and Industrial Engine Division of Chrysler Corp. in Los Angeles, Calif. He will be located at the Chrysler Motors of California plant, Eastern and Slauson Streets, Los Angeles.

R. H. Proctor, formerly sales representative in the Los Angeles area, has been assigned to other duties.

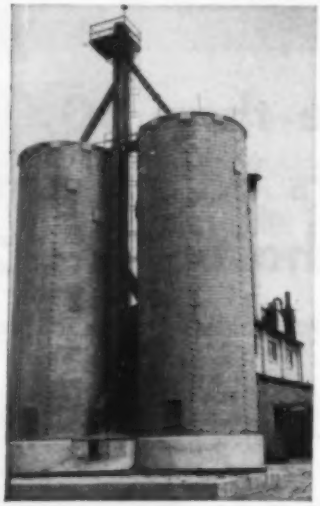
Chain Belt Co., Milwaukee, Wis., announces the opening of three new district sales offices. An office at Charlotte, N. C., has been opened at 501 E. Morehead St., under the supervision of Ray Traylor. Another office was established in Cincinnati, at 1720 Section Road. Charles Stanton is district sales manager there. A third area sales office is now operating in Moline, Ill. This office is under the supervision of Bruce Genzel.

R. M. Brown, district sales representative for Euclid Division, General Motors Corp., Cleveland, Ohio, since 1950, has been appointed manager of the sales and service branch in Hibbing, Minn. He succeeds J. W. Bloomquist, who returns to Cleveland as domestic sales manager.

J. E. Ehlert has been appointed district sales representative for the territory formerly covered by Mr. Brown. He joined Euclid in 1946.

Euclid Division also announces the appointment of Min-A-Con Equipment Co., 1914 East Buchanan St., Phoenix, Ariz., as a dealer.

Here's the way to handle and store bulk materials



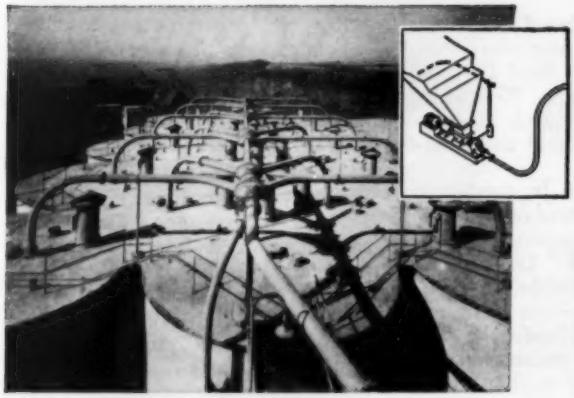
You are looking at two Neff & Fry storage bins at the Monroe, Mich., plant of Detroit Stoker Co. They are used for handling and storing coal. Each is 20′ dia. x 55′ high. Total capacity is approximately 1600 tons. We also erected three 14′ x 40′ bins for the same company to handle and store foundry sand.

Naturally, materials are put into and withdrawn from the bins by power, eliminating virtually all manual labor. We collaborated with the manufacturers of equipment in designing the conveying systems.

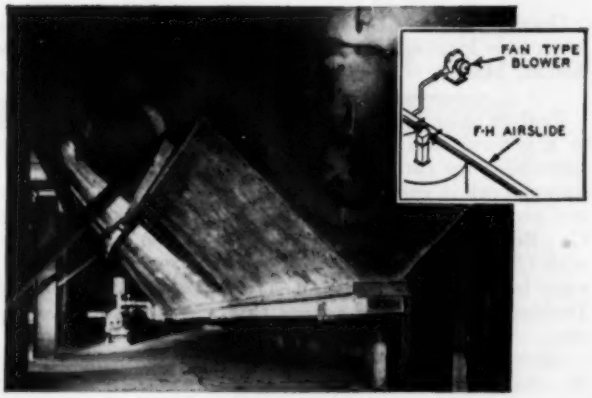
Our bins (silos) have many advantages over other types of bins. Complete information is given in our folder, "Bins With the Strength of Pillars." Ask for a copy.

THE NEFF & FRY CO. • 278 Elm St., Camden, Ohio

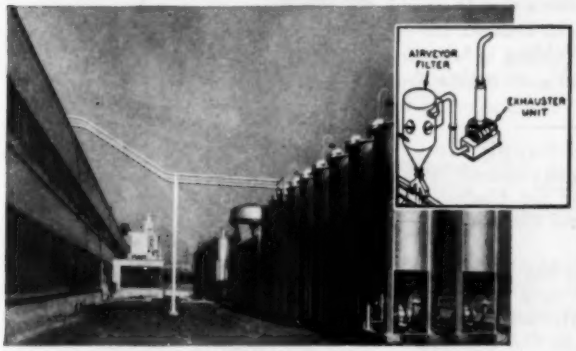
NEFF & FRY SUPER-CONCRETE STAVE STORAGE BINS



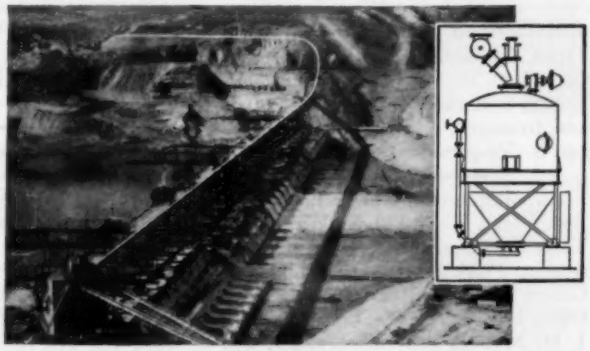
Fuller-Kinyon System



F-H Airslide



The Airveyor



Fuller-Fluxo System

PUT *Air* ON YOUR PAYROLL . . .

MAKE IT *flow* MATERIALS FOR YOU

Fuller equipment for conveying dry pulverized, crushed, and granular materials to and from carriers, storage and processing points has made manual movement obsolete, inefficient and costly.

Fuller manufactures four basic type of air-conveyors, each with its own unique features to meet specific requirements. All Fuller systems are designed for flexible application—especially in plants where building layout and design create unusual material handling problems. Fuller systems convey anywhere—up, down, horizontally, around corners, overhead, underground—anywhere a pipe line can be run.

Fuller-Kinyon Conveying System — conveys dry, pulverized materials to and from cars, ships, barges, storage and processing points.

F-H Airslide—flows dry, fine materials, fluidized with low-pressure air, down slightly inclined channels. Dust proof—no moving parts—no lubrication.

The Airveyor—transports dry, granular, or crushed materials to and from carriers, storage areas, and processing points.

Fuller-Fluxo System—moves dry, pulverized materials economically over long distances.

Over a quarter of a century of experience in all phases of air-conveying goes into every engineering study, which will show how you can solve your material-handling problems, efficiently and economically. A study of your problem will be made without charge or obligation. It you are interested in less costly materials handling, send for Bulletin G-1, today.

Write for Bulletin G-1, illustrating and describing four air-conveying systems by Fuller.

FULLER COMPANY—CATASAUQUA, PA.

Branch offices

Chicago • San Francisco • Los Angeles • Seattle • Birmingham

Fuller

DRY MATERIALS CONVEYING SYSTEMS AND COOLERS • PREHEATERS • COMPRESSORS AND VACUUM PUMPS • FEEDERS AND ASSOCIATED EQUIPMENT G95

Goodall Rubber Co., nas moved to its new location at 220 Milk St., Boston, Mass.

Paul Schultz has been appointed to a general staff position with responsibility for carrying on standardization work in engineering and control procedures by Clark Equipment Co., Buchanan, Mich. He has been with Clark for 20 years, with experience in both the Industrial Truck Division and the Automotive Division.

Morgan's Inc., 111 West Broad St., Savannah, Ga., has been appointed to sell and service the line of fork trucks, straddle carriers, and other materials-handling equipment manufactured by the Industrial Truck Division of Clark Equipment Co. Sam H. Morgan is president, Lorton S. Livingston is vice-president and treasurer, and Edward H. Morgan is vice-president and secretary.

Appointment of Power Brake and Equipment Co., 230 S. Water St., Tampa, as distributors in central and western Florida is announced by The Galion Allsteel Body Co., Galion, Ohio. F. E. Berkhams, president, and J. H. Myrick, general manager, will direct Power Brake sales.

Promotion of Stephen L. Ingersoll to the post of executive vice-president of the Ingersoll Steel Division of Borg-Warner Corp., Newcastle, Ind., has been announced. He previously was vice-president and treasurer.

Harold G. Ingersoll Jr., previously assistant to the president of the division, was elected vice-president and secretary. Ralph W. Leigh, also formerly an assistant to the president, was named vice-president in charge of sales. William C. Zepf, who previously was assistant secretary, now becomes treasurer.

J. P. Coughlin, former manager of the Arc Welding Division of Westinghouse Electric Co. in Buffalo, has joined Eutectic Welding Alloys Corp., Flushing, N. Y., as assistant to the president.

Dietz Industrial Supply Co., Aurora, Ill., has been named an authorized distributor for Carboloy Department of General Electric Co., Detroit, Mich.

Michael D. Barnett has joined the Carboloy department as a sales representative in the Midwestern district. He will reside in the Chicago area.

Ross R. Worthington has been appointed sales manager of the Bagpak Division, International Paper Co., New York, N. Y. He succeeds Roy I. LaMarche, who is retiring after 50 years of service.

Mr. Worthington first joined International Paper in 1934 as a chemist with Bagpak, Inc., a subsidiary company which later became the Bagpak Division. He was named assistant division sales manager in 1953.

Succeeding Mr. Worthington as assistant sales manager will be A. G. Clarke, who has been district sales manager in Boston and Atlanta.

Ross R. Worthington

Joe A. Wicke

Joe A. Wicke has been promoted to the position of advertising manager of Iowa Manufacturing Co., Cedar Rapids, Iowa. He joined the engineering department of Iowa Manufacturing Co., in 1942 and was made assistant advertising manager in 1950. He will be assisted by William E. Yount Jr.

Robert J. Hirsch has been appointed district sales manager at North Haven, Conn., by The Lincoln Electric Company of Cleveland, Ohio. He comes to his new post after five years experience in the Pittsburgh district.

Richard P. Lindgren has been appointed to the position of district manager in Moline, Ill. He was formerly manager at North Haven.

Francis B. Speaker has been named manager of non-ferrous metal mining industry sales development by Hewitt-Robins Inc., Stamford, Conn. He joined Hewitt-Robins in 1945.

Lewis W. Krumbein has been named co-ordinator of Lift Truck promotion and Richard M. Taylor head of market research by the Hyster Co., Portland, Oreg.

Mr. Krumbein has been with Hyster for five years as market research director. Mr. Taylor has been in the company's market research department for over a year and moves to Mr. Krumbein's previous job.

Sprague & Henwood's "ORIENTED" Diamond Bits

Cut Faster Last Longer Cost No More

for quick action call DIAMOND 4-8507 at Scranton

Most Economical Diamond Bits Ever Produced

After proving in our own world-wide contract drilling operations that Sprague & Henwood Oriented Diamond Bits (in which each individual diamond is set with its hardest edge or "vector" toward the work) cut much faster and last much longer than when diamonds are set at random, we made them available to other users and THOUSANDS are now cutting costs for diamond-drill operators throughout the United States and many other countries.

Specialized equipment and large-scale production enable us to furnish them in a wide variety of types and sizes, with either cast- or powdered-metal matrices, at no advance in price; making them the most economical diamond bits ever produced.

Bulletin 320 illustrates and describes all types and gives complete working data. Write for a free copy and tell us about your diamond drilling requirements. Our experienced executives welcome opportunities to make money-saving suggestions.

SPRAGUE & HENWOOD, INC. SCRANTON 2, PENNA.

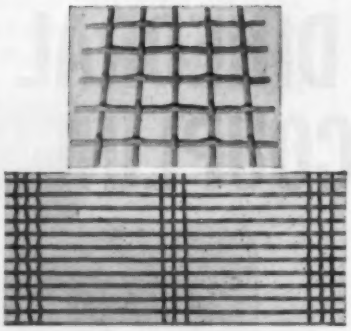
BRANCH OFFICES: NEW YORK - PHILADELPHIA - PITTSBURGH - GRAND JUNCTION, COL. - BUCHANS, NEWFOUNDLAND

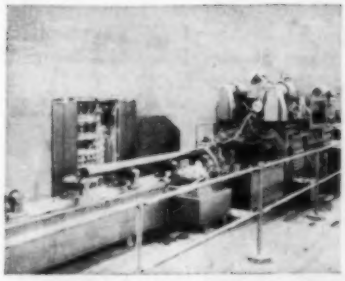
THREE GOOD WAYS TO CUT YOUR MAINTENANCE COSTS

USE IOWEAVE SCREEN CLOTH

Ioweave is made by Cedarapids from a special analysis, oil tempered wire that will withstand fatigue and wear against abrasion. This high quality wire makes it possible to use a lighter gauge for a given size of opening, thus greatly increasing the tonnage output.

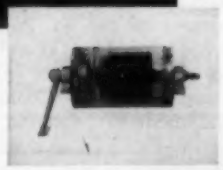
Ioweave is available in a wide range of sizes and weaves to fit your needs. Write for Bulletin CS-4.





USE CEDARAPIDS CONVEYOR EQUIPMENT

The automatic machine shown here turns out a complete conveyor idler every 28 seconds with permanently sealed, oil lubricated, heavy duty, single row, self-aligning ball bearings which eliminate the need for field lubrication. Heavy gauge steel tubing rolls insure perfect and constant balance. Cedarapids conveyor troughing roll assemblies and return idlers are available in widths from 14″ to 48″. Write for Bulletin CON-1.



USE CEDARAPIDS MOTORIZED HEAD PULLEYS

You can cut your conveyor maintenance costs 70% to 90% by installing Cedarapids Motorized Head Pulleys. All the drive mechanism is contained inside the pulley shell so there are no chains, sprockets or sheaves out in the weather and dirt, no chain idlers to keep adjusted and oiled, no V-belts to adjust or replace, no shafts and drives to service and lubricate. Modernize your conveyors now with Motorized Head Pulleys. Write for Bulletin MP-1.

ALL ITEMS ALSO AVAILABLE FOR ORIGINAL EQUIPMENT MANUFACTURERS

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

The Cedarapids Line also includes: ***Portable and stationary crushing, screening and washing plants for stone, gravel and sand. Vibrator and revolving screens. Feeders. Hammermills. Double impeller impact breakers. Batch type and continuous mix type bituminous mixing plants. Driers. Dust Collectors. Vibrating soil compaction units.***

AJAX

DIHEDRAL COUPLINGS

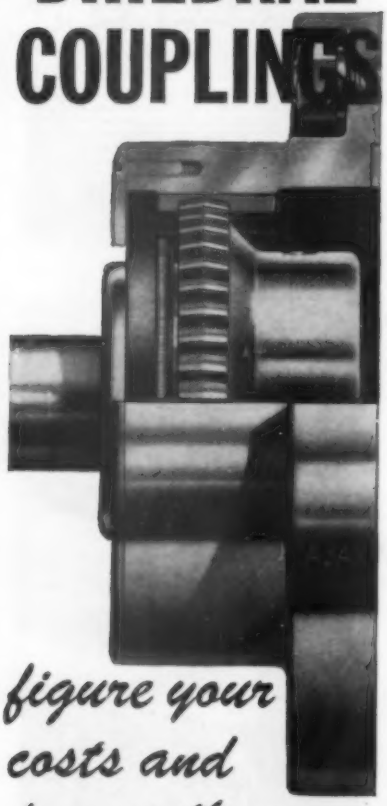


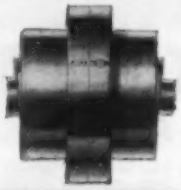
figure your costs and forget the price

● Ajax Dihedral Couplings are made to order for tough misalignment jobs. They handle misalignment heretofore considered excessive on stationary and mobile equipment involving weaving structures, heavy horsepower and shock loads.

One shutdown of your yard or plant makes the extra cost of an Ajax Dihedral Coupling insignificant!

Seals keep lubrication in and abrasive grit out.

If you have misalignment trouble you can't afford to be without Ajax Dihedral Couplings. Tell us your troubles.



AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.

Three appointments in the sales department of Solvay Process Division, Allied Chemical & Dye Corp., New York, N.Y., have been announced.

Advanced to the position of manager of their respective departments are: R. B. Anthony, special alkalies section; F. P. Boehm, ammonium and potassium products section; and H. R. Smith, calcium chloride section.

Mr. Anthony joined Solvay in 1928 as a salesman at the Boston branch. He worked in that territory until his appointment in 1953 as assistant manager of the department he now heads.

Mr. Boehm was originally employed in Solvay's technical service department. He was appointed assistant manager of the ammonium potassium products section in 1953.

Mr. Smith joined Solvay's technical service department at Syracuse in 1936. He transferred to the sales department in 1941, performing field engineering and promotional work in connection with calcium chloride sales until his present appointment.

Joseph R. Schaeffer, former assistant chief engineer, has been appointed chief engineer of the Blaw-Knox Construction Equipment Department, Blawnox, Pa. He joined the department in 1953, becoming assistant chief engineer in January.

R. A. McCullough has been named assistant chief engineer, succeeding Mr. Schaeffer.

Gar Wood Industries, Wayne, Mich., has announced the following appointments: H. H. Hippler, former division manager, has been named assistant director of sales and service administration; H. J. Howerth, formerly assistant sales manager of hydraulic hoists and dump bodies since 1953, has been named product sales manager for truck winches and cranes; Harold C. Clark, formerly eastern district manager for ditchers, excavators and road building machinery since 1952, has been named sales manager for Load-Packer refuse collection bodies; B. F. Whitbread, former manager of the direct factory truck equipment sales branch in Los Angeles since 1950, has been named product sales manager for hydraulic hoists and dump bodies.

Two new direct factory truck equipment sales branches, in Tulsa, Okla., and Springfield, Ill., have been opened. They will be managed by two veteran Gar Wood employees, D. C. Royce in Tulsa, and Carroll Merriett in Springfield.

A complete realignment of the multiwall sales force, based upon assignment of sales duties along manufactured product classification, has been announced by the Hudson Pulp & Paper Corp., New York, N. Y.

Also announced are the promotions of W. N. Cromwell, former northeast divisional manager to eastern sales manager, with headquarters in New York, and B. C. Drumm, former central divisional manager, as western sales manager, with headquarters in Chicago.

Felix J. Losson has been named manager of the Mining Division of Lakeland Engineering Associates, Lakeland, Fla.

The Mining Division was originally organized to serve the engineering and technical needs of the mining and metallurgical industry in Florida and the Southeast.

Mr. Losson is a registered engineer in Florida and was formerly chief engineer of the Florida Phosphate Division of the Davison Chemical Co., at Bartow, Fla.

Felix J. Losson

George J. Bockmann

George J. Bockmann has been appointed northwestern regional sales manager for The Galion Allsteel Body Co., Galion, Ohio.

For the last three years, Mr. Bockmann has been southeastern district manager of the St. Paul Hydraulic Division of Gar Wood Industries, Inc. His experience also includes service with the Omaha Body & Equipment Co., Omaha, Nebr.

The West Coast operations of Quaker Rubber Corp., New York, N. Y., and its recent acquisition, Pioneer Rubber Mills, Pittsburg, Calif., will be merged under the name of Quaker Pioneer Rubber Mills, Division of H. K. Porter Co., Inc.

The new division will handle all the sales, manufacturing, and service operations of both companies in ten Western states. The Pioneer and Quaker sales organizations will be combined in the East and operated as the Quaker Rubber Corp.

DIAMOND

Single pass PORTABLE CRUSHING PLANTS

MADE IN FOUR MODELS

No. 116	10"x16"	30-40 Tons/hr.
No. 120	10"x20"	40-55 Tons/hr.
No. 124	10"x24"	55-70 Tons/hr.
No. 136	10"x36"	70-90 Tons/hr.

USE IT HERE, THERE — *anywhere*

Your next job is — where? Well, it makes little difference whether it's a mile or two down the road, or way on the other side of the county, if you have a Diamond Single Pass *Portable* Crushing Plant at your command. It's light in weight, designed for frequent moving and quick setup; but above all, this Diamond Crushing Plant is the ultimate for efficient, economical production.

No. 124
10"x24"
55-70 Tons/hr.

THESE FEATURES HELP YOU INCREASE PRODUCTION

- Short wheel base and wheel bar tongue location provide excellent maneuverability in road or pit.
- Hinged delivery conveyor eliminates dismantling for towing.
- Low hopper height permits easy loading, with ½ or ⅜ cu. yd. shovel. Low over-all height promotes ease of travel.
- Heavy duty grizzly with proper size openings give higher crusher production with minimum scalping.
- Adjustable single eccentric plate feeder provides a constant, even flow of pit run material.
- Vibrating screen is oversize.
- Feeder is clutch operated.
- Power unit (gasoline or diesel) is plant mounted.
- Controls are centrally located.
- Good braking effort (mechanical or air) and fully guarded drives promote safety.

SEND FOR BULLETIN 1000 AND GET ALL OF THE FACTS AND SPECIFICATIONS

DIAMOND IRON WORKS

DIVISION GOODMAN MANUFACTURING COMPANY

Halsted Street at 48th Place • Dept. 1 • Chicago 9, Illinois

Please send your Bulletin 1000.

DIAMOND

Name_____ Title_____

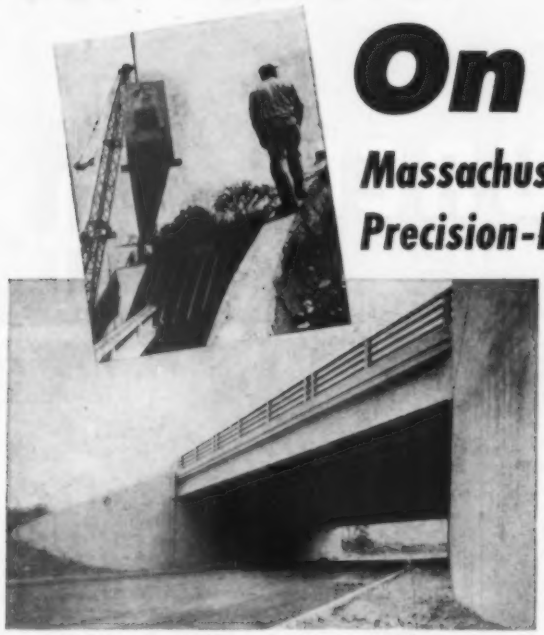
Company_____

Address_____

City_____ Zone____ State_____

On the Beam

Massachusetts Builds Handsome Bridges with Precision-Precast, Prestressed 'Incor' Concrete Beams — Spans up to 65 feet



Scotland Road Bridge: 24 beams of 65-ft. span, prestressed by Roebling method.

Hale Street Bridge: 18 beams of 64-ft. span, prestressed by Freyssinet method.

● In an area enshrined in yesterday's history, Massachusetts is today making construction history, with precast, prestressed bridges built with post-tensioned beams, spans up to 65 ft.

MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS has to date built seven prestressed bridges, using various methods of tensioning, as part of a far-seeing program. Four bridges, shown here, on Newbury-Newburyport Relocation of Route 1, have I-shape cross section, with depth-to-span ratios of 1:17 to 1:21. Beams are spaced 4½ ft. apart, decks cast in place. Overall lengths vary, but distance between diaphragms is constant.

Beams were fabricated by NEW ENGLAND CONCRETE PIPE CORPORATION under carefully controlled conditions, in an outdoor casting yard. Using 'Incor'* 24-Hour Cement, concrete was steam-cured, and even in cold weather, forms were stripped in less than 24 hours, and initial tension of 50 tons applied. The 4000 psi specified for full prestressing was attained in 24 to 27 hours.

Outstanding projects such as these re-emphasize the coming of age of prestressing, for important economies in concrete and reinforcing steel, as well as in erection. There is an inbuilt safety factor, too: During fabrication, members are subjected to greater loads than they take in the field. And concrete never has to be painted.

Designed for the material and method, not as a substitute for something else . . . with members cast to closest tolerances for fast erection . . . mass produced under controlled conditions—result, beautiful, enduring, economical structures to serve a highway-hungry nation.

*Reg. U. S. Pat. Off.

Design and Supervision
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
JOHN A. VOLPE, Commissioner
JOHN RUNDLETT, Bridge Engineer **H. G. GRAY**, Chief Engineer

General Contractor: **A. V. TAURASI CO.**, Boston

Beams Fabricated by: **NEW ENGLAND CONCRETE PIPE CORPORATION**
Newton Upper Falls, Mass.

Storey Avenue Bridge: 36 beams of 58-ft. span, prestressed by Lee-McCall method.

Pine Hill Road Bridge: 20 beams of 59-ft. span, prestressed by Prestressed Concrete Corp. method.

LONE STAR CEMENTS COVER
THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

Offices: ABILENE, TEX. • ALBANY, N. Y. • BETHLEHEM, PA.
BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON
INDIANAPOLIS • KANSAS CITY, MO. • NEW ORLEANS • NEW YORK
NORFOLK • RICHMOND • WASHINGTON D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 136,000,000 SACKS ANNUAL CAPACITY

The CONCRETE MANUFACTURER

November 1954

Do It Yourself—with Expert Advice

NOT many years ago enterprising real estate dealers, contractors, material dealers, and other interested parties were doing everything possible to stimulate interest in home building. Their slogan was "Own Your Own Home". Whether or not this slogan had much to do with it, a home building boom did get under way, and no end is in sight. Apparently everyone now wants to own his own home.

More recently someone brought out another slogan, "Do It Yourself", and this one has also caught on. Apparently every home-owner has gotten the urge to be a jack-of-all-trades. There can certainly be no criticism of this reversion to the self-sufficiency of earlier days; it may even be an important factor in the building boom.

This "Do It Yourself" boom has, however, intensified a problem which has confronted building materials manufacturers and dealers for many years. Most of these amateur carpenters, masons, plumbers, electricians, etc., are completely unqualified to do such work, and they often come up with results that are far from satisfactory and which reflect on the products used.

A good example of what can happen when an amateur tries to do a specialist's work was recently given nationwide publicity, complete with photographs. A young home-owner decided to build a concrete block swimming pool in his yard. In building it he made his most serious mistake by placing it above ground. As might be expected, when he filled the pool with water, one of the walls gave way.

Fortunately no one was in or near the pool at the time, so no one was hurt. The harm done to the concrete block industry, however, was serious, due to the nationwide publicity given this incident. The newspapers all made it evident that concrete blocks were used, but not that they were improperly used. There was no evidence in the picture that reinforcement had been used in the walls or that they had been braced in any way. Apparently also this amateur builder had consulted no engineer, architect, or any other qualified person before going ahead with this building project. Many others who also see the economy of doing their own work have much better results; they take advantage of the free and expert advice available to them. But they do not make the front page.

Every progressive concrete products manufacturer provides for his customers literature which will answer any question. Apparently, however, producers do not always see to it that the customer who needs help and advice actually gets it; and many manufacturers provide no information. The only way to prevent embarrassing and harmful incidents like the one described is for each manufacturer to see that every customer who needs help and advice gets it, and to follow through on each sale, however small.

Walter E. Trauffer

ON THE JOB!

THE NEW TRAVEL BATCHER

The TRAVEL BUTCHER can travel behind a truck with complete safety without Hi-way violation. On arriving at a destination, average set-up time is ten minutes.

Batch mixture is maintained uniformly with accurate scales mounted on the machine. The capacity of the TRAVEL BATCHER is 60 yards an hour delivered into mixer trucks.

By bringing the batch plant closer to the job, it reduces the number of truck mixers needed by as much as 83%.

Maintenance bills, long a headache of every ready-mix concrete operator, are reduced to a minimum.

The TRAVEL BATCHER offers the performance of a stationary batch plant, plus the convenience of mobility.

NORTH . . . EAST SOUTH . . . WEST

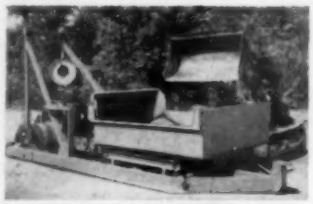
Satisfied customers everywhere make similar statements.

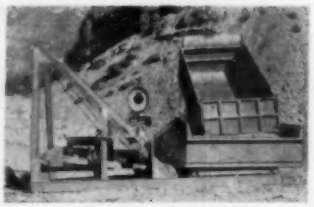
THEODORE LORANGER & SONS
in New Bedford, Mass. say,

"My new Travel Batcher is ruggedly constructed to give the best results. Instant maneuverability makes this machine invaluable for multiple pours in one day."

ALBERT LORANGER

The hopper, with a capacity of 8 yards can be recharged with either a dump truck or a front-end loader.





TRAVEL BATCHER

For additional information write, wire or phone:
SOUTHEAST READY-MIX - 6450 HOLLADAY BOULEVARD - SALT LAKE CITY, UTAH

Another BESSER Booster*

★ This is the 113th of a series of ads featuring leaders in the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Hervé Beaudry and his three sons, Jacques, Roger and André, all active in the block business.

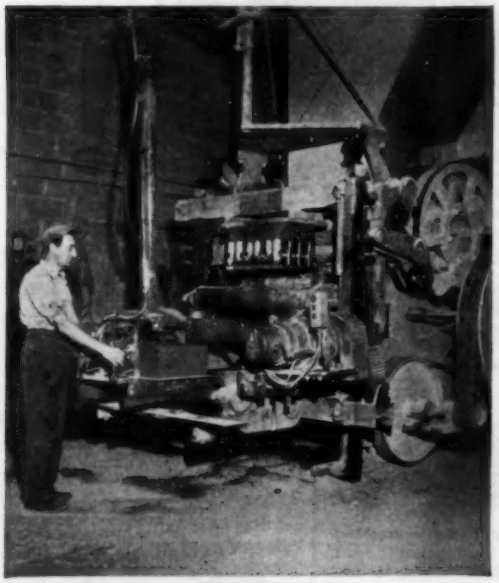
Father and Three Sons Operate Successful VIBRAPAC Block Plant in Montreal, Que.

H. Beaudry Concrete Block Company Ltd., Montreal, Quebec, started to manufacture concrete block more than twenty-five years ago. Success with the Besser Vibrapac has paved the way for a big expansion program. A new plant, now under construction, will soon be ready for operation.

"We are using the Besser Vibrapac because it is the most dependable machine on the market", states Hervé Beaudry, owner and operator. The Vibrapac is currently producing more than a million 8" x 8" x 16" block (or equivalent units) annually.

BESSER COMPANY, Box 131, Alpena, Mich., U. S. A.

Complete Equipment for Concrete Block Plants



Besser Vibrapac at the Beaudry Concrete Block Company plant. Produces three 8" x 8" x 16" block on one Plain Pallet. Other sizes, in equivalent multiples on the same set of Plain Pallets. Fully automatic. Operator merely guides the power off-bearing hoist.

Yard scene at the Beaudry plant. Note stock piles of Vibrapac Block. All units made with the Besser Vibrapac.

New Block Plant in North East Montreal

This large modern plant is now under construction. It has capacity for three Vibrapacs and is equipped with seven special type curing rooms. Eventually, the three sons of Hervé Beaudry will take over the business.

BESSER 50th Anniversary 1904-1954

A Half Century of Concrete Masonry Progress!

A 8075-1P3

SIMPLE in operation
RUGGED in construction
DEPENDABLE in performance

SAVE TIME—SAVE MATERIAL
SAW MASONRY or CONCRETE with

Clipper "SAILS RIGHT THRU"®
SAWS & BLADES

. . . known the world over as the "Finest" in Masonry and Concrete cutting equipment. Clipper's nearly twenty years of experience and consistent quality assure you of the fastest, most economical masonry and concrete cutting. Try a CLIPPER on **FREE TRIAL.**
See Why 4 Out of 5 Buy Clipper!

Mr. Clipper

ABRASIVE
The consistent quality of Clipper WET and DRY cutting Abrasive Blades guarantees you of the fastest cut . . . at the lowest cost . . . with the greatest ease. Only Clipper gives you a complete selection of specifications for any cutting job.

"CBR"
Favorite blade of thousands of masonry saw and hand power saw owners. A Clipper "CBR" Break-Resistant Abrasive Blade is virtually unbreakable . . . bend it — twist it — drop it! For difficult grinding cuts impossible to make with standard abrasive blades.

DIAMOND
Amazing cutting speed and performance are yours with a genuine Clipper Diamond Blade. Rigid quality control, manufacturing "know-how", and the ability to select and use the best materials make Clipper Diamond Blades the World's Finest . . . Use one on your next job!

Clipper Blades Fit Every Make and Model Masonry, Concrete, or Hand Power Saw.
Genuine Clipper Blades are available in sizes and with arbor shapes to fit any make masonry, concrete, or hand power saw. Buy Clipper Blades by the case for Greater Savings!

Clipper MASONRY SAW

The World's Finest Masonry Saw. Simple in operation — Rugged in construction — Dependable in performance. Clipper's patented-exclusive features give you unmatched cutting action. "Select-A-Notches" give instant, positive height adjustments . . . "Pressure Equalizer" automatically adjusts blade pressure. Clipper's FREE TRIAL guarantees you satisfaction at no obligation.

Clipper CONCRETE SAW

Self-propelled — and powered for heaviest duty — Clipper's new "ConSawMatic" Saws get better results from EVERY Blade—for lowest cutting cost per foot. Contraction Joints in highways and airport runways—Trenches for conduits, sewers, gas and water lines—Warehouse Floors of monolithic concrete—ALL use genuine Clipper Saws and Blades—the Perfect Combination for Quality Results!

MODEL C-250
25 H. P.
ONE OF 7 MODELS
FROM $395

Clipper
FREE TRIAL
YOUR ONLY GUARANTEE OF COMPLETE SATISFACTION ACTUAL ON-THE-JOB TEST!
No. 103

2801 N. WARWICK • KANSAS CITY 8, MO.

SAME-DAY SERVICE—WRITE OR SEE YOUR PHONE BOOK

- ATLANTA
- AUSTIN, TEX.
- BIRMINGHAM
- BOSTON
- CHARLOTTE, N. C.
- CHICAGO
- CINCINNATI
- CLEVELAND
- DALLAS
- DENVER
- DETROIT
- HARTFORD
- HOUSTON
- INDIANAPOLIS
- LOS ANGELES
- MILWAUKEE
- NEW ORLEANS
- NEW YORK
- PHILADELPHIA
- PITTSBURGH
- SAN FRANCISCO
- SEATTLE
- ST. LOUIS
- ST. PAUL
- WASHINGTON, D.C.

FACTORIES IN ENGLAND AND FRANCE

SOLD ONLY DIRECT FROM CLIPPER FACTORY BRANCHES

NEWS OF THE CONCRETE INDUSTRIES

Board of Directors Of Expanded Shale Inst. Holds 3rd Annual Meeting

The board of directors of the Expanded Shale Institute held its third annual meeting on September 29 through October 1 at the Sheraton Hotel in Chicago, with president Warren W. Allen presiding.

Reports were made on research programs now under way and new research programs scheduled to be carried out over the next few years. Of particular interest was the institute's recently completed performance survey of expanded shale concrete for 45 bridge decks, built over the last 20 years. Many letters were received from engineers commenting on the service this timely survey will render the construction industry in view of the huge road-building program beginning in this country today. Recommendations were made that more space in the institute's publication, *Concrete Facts,* be devoted to concrete masonry, with emphasis on its use in housing.

The directors visited the Portland Cement Association's laboratory at Skokie, Ill., where they were shown a number of research studies, including various phases of expanded shale concrete.

At a dinner for members, their wives, and guests, S. Carl Smithwick, immediate past president of the institute, was presented a desk set from the members for his outstanding service. The following resolution was passed unanimously:

"You have been honored much in your career. Your status in the Expanded Shale Institute is well established. The membership has previously caused to be put into the minutes a record of its sentiments toward you and the work and effort you have put into this organization. The inspiration to organize—twice president—and more recently editor—are in part captions that describe what you have done for the E.S.I. In further recognition, we hand you from the membership this gift which is appropriately inscribed."

Coming Events

January 9-13, 1955—Miami. 25th annual convention, National Ready Mixed Concrete Association. Miami Municipal Auditorium.

January 12 and 13, 1955—Milwaukee. 35th annual convention, Wisconsin Concrete Products Association. Plankinton Hotel.

January 17-19, 1955—Niagara Falls, Ont. Annual convention, National Concrete Products Association (Canadian). Sheraton-Brock Hotel.

January 24-27, 1955 — Cleveland. 35th annual convention, National Concrete Masonry Association. Cleveland Public Auditorium.

January 30-February 2, 1955—St. Louis. Fifth annual convention and show, Mason Contractors Association of America. Jefferson Hotel.

February 21-24, 1955—Milwaukee. 51st annual convention, American Concrete Institute. Hotel Schroeder.

March 9-12, 1955—Boston. 47th annual convention and meeting, American Concrete Pipe Association. Sheraton-Plaza Hotel.

• The board of directors of the Expanded Shale Institute, their wives, and guests, at a dinner at the Sheraton Hotel Chicago, Ill., during the third annual meeting.

United Concrete Products Announces Production Of Ceramic-Glazed Units

Concrete building blocks with true ceramic glazed faces are being produced at the Wichita, Kans., plant of United Cement Products Company. This firm is believed to be the first to make units of this type.

For several years the Miller brothers, Max H., John P., and L. A., owners of the company, had been interested in producing a true ceramic-covered block. Co-operating with the Ferro Corporation of Cleveland, Ohio, which after 15 years of work on the problem had achieved a successful glaze, United now has announced the new product.

At Max Miller's request, Allied Engineering Division of Ferro Corp. assigned K. E. Evans to Wichita to install the equipment necessary for the manufacture of glazed block. Under his supervision 3,000 sq. ft. of the United plant was converted to an installation for the new process. The materials for the glazed finish are shipped to Wichita from Cleveland. Standard units made by United Cement Products are sprayed with the finish and cured in the kiln.

A special advantage claimed for these glazed units is that a structural wall having a finished surface may be built with them in one operation, thus effecting a considerable saving in cost. United is now producing the block in four standard colors.

The new Andersen Sand & Gravel Company concrete mixing plant at Saginaw, Mich., recently went into production. The $100,000 plant is headed by Frank N. Andersen.

R/y Ready Mix

By Harry F. Thomson

Truck Holding Time—A Perpetual Headache

(*Continued from the October issue*)

FREQUENTLY there is some psychological value in submitting an invoice for holding time although it is anticipated that a compromise in the amount may have to be accepted. In many instances, particularly on large projects, the job superintendent is occupied elsewhere, and he may not be aware that his crew is delaying the trucks through lack of coordination or other reasons. An invoice for holding time received at the customer's main office serves to call attention to an apparently inefficient handling of the trucks by the job crew. When the head office calls on the superintendent for an explanation of the extra billing, he may insist that the charge is excessive, but on subsequent deliveries he will probably be more alert to see that trucks are discharged promptly, as he will want to avoid being called on for explanations.

A rather elaborate plan for treating the holding time problem with fairness to both the producer and the customer was adopted by a large West Coast company some years ago. With the billing for each day's deliveries to important jobs, there was issued a credit or debit memo expressed in dollars for truck time during the day, a credit for release of trucks in less than the free-time, and a debit for holding longer than the free time. At the end of the month the credits and debits were totaled, in much the same way as the railroads handle demurrage, except that a dollar refund was allowed the customer in case of an excess of credits for the month. This plan was reported to be well received by the trade; but gradually some customers who indicated pleasure at receiving credits began to find excuses to object to debits. After an extended trial the producer discontinued the plan, as it was concluded that the results did not justify the extra record-keeping involved.

On deliveries to small owner-jobs and C.O.D. trade it is not always feasible when the order is placed for the clerk to explain that the unit price quoted applies if trucks are released within a certain free time, and that an extra charge will be assessed for holding the truck beyond that time. Adjustment for delays on such deliveries must be made by the truck driver. To assist in meeting the explanation, "I was not told about any extra charge," the driver may be supplied with printed cards which state the company's policy and rate for the truck time, to be handed to the customer. A typical card for this purpose is shown in the illustration. If the matter of the charge is left for the driver to explain without supporting evidence, the customer may think the extra is a shakedown by the driver for his own pocketbook. The explanatory card has been helpful in making collections and avoiding disputes over holding.

TRUCK-TIME AT JOB

The driver of this truck must account for the truck-time from leaving the Yard until he returns.

"Free time" for unloading is allowed on the basis of 4 minutes per cu. yd., after arrival at the job address.

A charge of 10c per minute is assessed for all truck-time beyond the free time.

On C.O.D. deliveries, the driver is instructed to collect for such excess waiting time, in addition to the invoiced price of the concrete.

SPACE FOR COMPANY NAME

To prevent misunderstandings on the part of the customer, a 5- by 3-in. card like this one may be handed to him. It clearly states the firm's policy and rate for truck time.

For jobs which justify a written agreement with the customer, the problem of holding time should be covered in the seller's contract form. The two following clauses which are included in the suggested *Standard Clauses for Sales Agreements in the R.M.C. Industry,* published by the National Ready Mixed Concrete Association, are offered as an intelligent approach to the problems discussed in the foregoing remarks:

Par. 5.—All deliveries will be made to the best of the Seller's ability and dispatch, but no claims will be allowed because of delays in deliveries.

Par. 10.—Trucks held at the work site for more than . . . minutes will be billed to the Purchaser at the rate og $..... per hour for all excess time. . . . .

But when including in the contract form a provision such as suggested in the foregoing paragraph, it may be well to ascertain, if possible, that the competition is submitting a similar provision. A painful situation occurred sometime ago on a government job. One bidder quoted on a printed form which included such a clause regarding holding time, and a second bidder quoted a slightly higher price written on its company letterhead without reference to holding. The government's supervising officer insisted that the contractor award the order to the second bidder on the theory that the first bid was "indeterminate" due to a possible unknown amount of additional charge for holding.

From the producer's standpoint any considerable holding of trucks on a job may create a serious problem quite aside from the expense of the truck time, and that is the disruption of promised deliveries to other jobs later in the day. The first customer says blandly, "Let the other fellow wait," and the second customer can't (or won't) understand why promised deliveries do not arrive. In such a case the producer is the third party, caught in the middle through no fault of his own. Here super-diplomacy may be required. He would rather have the trucks returned without delay than receive the amount charged for holding time.

In the discussion included in the above-mentioned publication of suggested *Standard Clauses for Sales Agreements,* it is stated that "Some (ready-mix producers) have said it is impossible to work out a basis

(*Continued on page* 226)

Steady Progress Noted At Badger Concrete Co.—Now Half-Century Old

In a history replete with constant progress since its founding in 1904, Badger Concrete Company, Oshkosh, Wis., represents a typical producer of a well-rounded line of concrete products serving a medium-sized industrial community. Realizing that success in this field is dependent upon being able to offer the contractors allied products at any time, Badger has gradually extended the lines they first produced into many more—all of which are used in the residential, business and industrial construction industries.

Concrete blocks constituted the bulk of the initial production, followed in a few years by the manufacture of concrete burial vaults and cast stone trim. Just prior to World War II, the firm added Mo-Sai architectural precast facing and floor and roof slabs. Concrete pipe had also been included among their endeavors before the advent of the war which partially paralyzed the building industry in Oshkosh. With typical acumen, Badger contracted to make concrete practice bombs for the Air Force, and concrete shower trays for the numerous government housing projects. The volume of these adjuncts to their regular lines permitted the company to retain their trained personnel during the war, as well as to maintain their already established position in the industry.

The most modern equipment is utilized within the plant and over the large storage areas surrounding it. A latest-type Besser Vibrapac block machine, with power offbearing hoist, enables the plant to turn out 10,000 blocks daily. Modern-designed, steam curing chambers produce high-strength concrete units usable 24 hours after manufacture.

Modern lift trucks accelerate the pace of handling all products through the plant.

The firm offers two general types of masonry units—still the major portion of their total output—including the heavyweight sand and gravel aggregate units, and the lightweight units, for backup, built with slag and Haydite aggregates. Producing both types, Badger can sell the wall material for a structure from foundation to roof peak. It can also provide the floor and roof, with the Mo-Sai facing. The concrete pipe provides for drainage lines, burial vaults and other precast lines supply a general local market.

Edward Olsen, son of the founder, is now president and general manager of the company, which employs from 25 to 40 persons.

● General view of plant and storage yard of Badger Concrete Co., Oshkosh, Wis., which celebrates its 50th year of production of many concrete items.

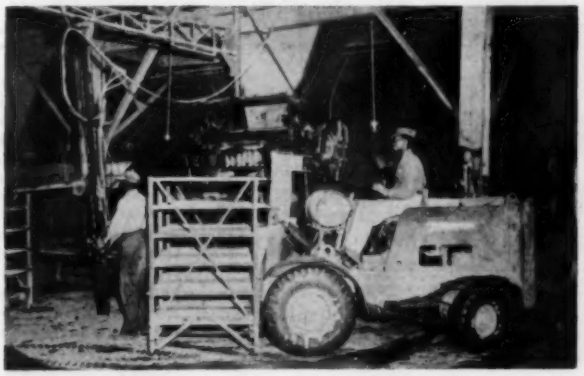
Big Mix Plant Transported To Dalles Dam Project Site

The concrete mixing plant used by Consolidtaed Builders on the Detroit and Big Cliff dams on the Santiam River improvement projects in Oregon has been moved to The Dalles dam site on the Columbia River.

This plant will replace the former batch plant at the new construction, which collapsed recently, and will provide one-third more production of concrete. It is expected that the new installation will be in operation in the immediate future.

● These two views, which were taken at the John A. Denie's Sons Co. (Memphis, Tenn.) block and ready-mix plant at nearby Fraser, show the use of liquid propane gas in the firm's fleet of mobile equipment. Left: Henry O. Pommer, vice-president of the firm, standing beside an L.P.G.-converted 5-cu. yd. truck mixer. The truck has a 42-gal. fuel-storage tank, the fuel being used for both the truck and mixer motors. Right: A block plant view showing one of the six L.P.G.-converted 3-ton fork-lift trucks. Note the 24-gal. fuel-storage tank mounted in front of driver.

The firm, known as the oldest building material concern in the South, switched to L.P.G. from gasoline about four years ago, converting its entire truck fleet of 55 truck mixers, as well as its many trailer, small delivery, and fork lift units. The changeover was based primarily on the relative cheapness of the fuel and its clean burning characteristic. From a performance standpoint the owners report that L.P.G. has yielded about the same mileage per gallon as gasoline, yet it costs substantially less. Concerning cleanliness, oil changes are required only a few times per year; it was also reported that truck motors using L.P.G. had gone 100,000 miles without having required an overhauling.



New Roof-Deck Manual Sets Working Standards For Perlite Industry

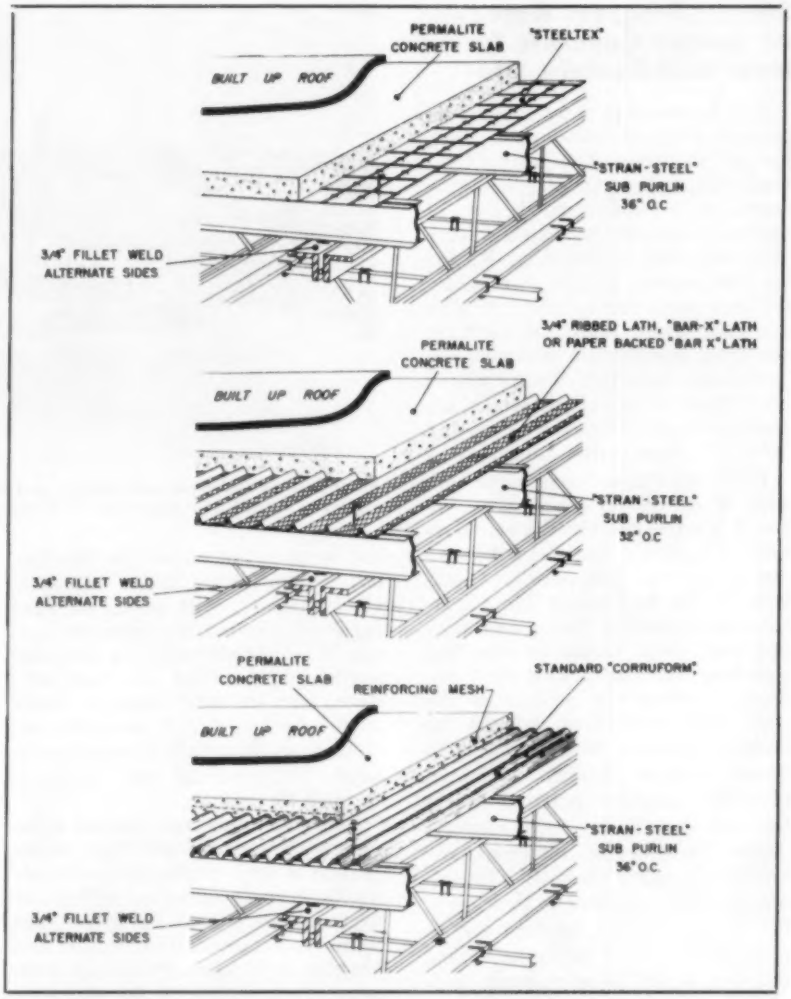
Prepared primarily for the use of architects and structural engineers, a Permalite Concrete Roof Deck Specification Manual has just been published by the Perlite Division, Great Lakes Carbon Corporation.

Time is always at a premium to the architect and the engineer. This manual will be a boon to them; it can save much time by eliminating the necessity of checking dozens of suppliers' catalogs and by eliminating the tedious task of calculating the overall "U" factors for combinations of various materials. By quick reference, the architect may select any one of several alternative types of roofs having the desired insulating value. After having chosen one or more applicable designs, he can proceed with his detailed engineering and cost calculation. Illustrations included can greatly facilitate the preparation of final detailed drawings.

Physical properties given for lightweight insulating concrete are based upon the use of Permalite-Alexite perlite ore. This material, mined and prepared near Florence, Colo., is said to yield a lightweight, insulating concrete of recognized high quality.

The manual is divided into two parts: I—Structural, and II—Non-Structural. Part I covers lightweight concrete roof-deck designs and contains complete drawings, specifications, and desired technical data. Part II includes insulation data, tables, charts, drawings, and specifications for Permalite (perlite) concrete used for insulating fill over various types of structural roof-decks.

Distribution of the 144-page de luxe, loose-leaf volume is being made largely through Permalite franchisees in 18 states and three firms in Canada.


PERMALITE CONCRETE SLAB
"STEELTEX"
BUILT UP ROOF
"STRAN-STEEL" SUB PURLIN 36" O.C
3/4" FILLET WELD ALTERNATE SIDES
3/4" RIBBED LATH, "BAR-X" LATH OR PAPER BACKED "BAR X" LATH
PERMALITE CONCRETE SLAB
BUILT UP ROOF
"STRAN-STEEL" SUB PURLIN 32" O.C
3/4" FILLET WELD ALTERNATE SIDES
PERMALITE CONCRETE SLAB
REINFORCING MESH
STANDARD "CORRUFORM"
BUILT UP ROOF
"STRAN-STEEL" SUB PURLIN 36" O.C
3/4" FILLET WELD ALTERNATE SIDES

Typical page from the section devoted to drawings in the new manual covering perlite concrete roof-deck design.

Manufacturers' Div., N.C.M.A. Lays Plans for 1955 Action

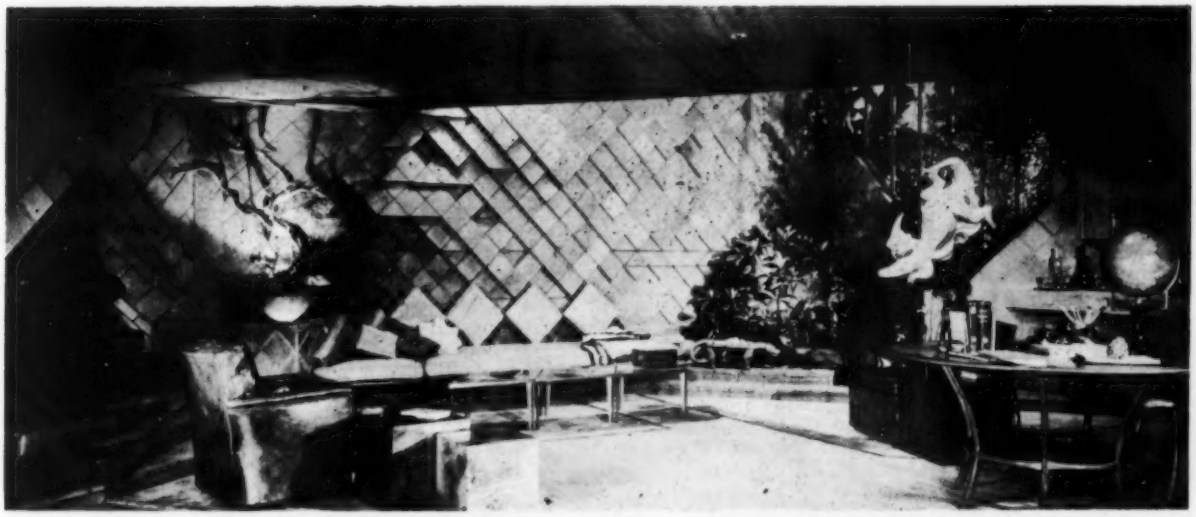
The newly formed Manufacturers' Division of the National Concrete Masonry Association, in a recent letter to all associate members of N.C.M.A., reviewed the formative activities of the last year and outlined plans for the future. The division was created at a meeting of a majority of exhibitors during the 1954 N.C.M.A. annual convention, a constitution was submitted and accepted, and officers and directors were elected. These actions were submitted to the board of directors of the association; and, with one exception, the constitution was approved by that body.

A meeting of all exhibitors interested in this division has been called for January 23, 1955, at the Hollenden Hotel, Cleveland, Ohio, to make necessary changes in the constitution, to appoint a space allocation committee for the 1957 meeting, to elect new officers for 1955, and to act on other problems.

The following constitute the officers and directors of the division: chairmen, Kenneth P. Karr (Butler Bin Co., Milwaukee, Wis.), vice-chairman, V. H. Berg (Worthington Corporation, Plainfield, N. J.), C. S. Delameter (Gene Olsen Corporation, Adrian, Mich.), Fritz Forrer (Spray-O-Bond Co., Milwaukee, Wis.), and George Erickson Jr. (Erickson Power Lift Truck Co., Minneapolis, Minn.). Directors include R. P. McKenrick (Blaw-Knox Co., Pittsburgh, Pa.), Robert W. Smith (T. L. Smith Co., Milwaukee, Wis.), Otis H. Manchester Jr. (Concrete Transport Mixer Co., St. Louis, Mo.), Haakon Paulson (Besser Co., Alpena, Mich.), Daniel Urban (Kent Machine Co., Cuyahoga Falls, Ohio), M. F. Ledford (Stearns Mfg. Co., Adrian, Mich.) and Daniel D. Truax (Truax Machine and Tool Co.), Seattle, Wash.

About Our Cover Picture

• This month's cover picture shows a job installation of the lightweight, pre-arched system of sectional concrete slabs manufactured by the Rapidex Corporation of Indianapolis, Ind., from concrete units made on standard block machines. The top and bottom faces of the units are machine-ground to tolerances of .004 in., with a slight keystone effect which produces the necessary camber in the assembled slab. The blocks are drawn into compression with a pull rod, and reinforcing is inserted; this steel is later imbedded in a cement grout pumped into the space around the bars. Similar grout forms the top groove key concrete which is in compression stress.



House Beautiful called this a room to be alone in, describing the above as a panoramic view showing magnificently how a room can be all of one piece, a whole; yet motifs are not monotonous.

Glamour in Concrete Excites a Million Viewers

Probably the outstanding hit of the Los Angeles County Fair, held September 17 to October 3, was the all-concrete masonry room, a promotion of the National Concrete Masonry Association, and featured by *House Beautiful* in the October issue, in which a faithful depiction of the material was shown in natural colors on the front cover and in several pages of lifelike reproductions.

Over a million people in the course of the fair viewed the room, one of 22 co-sponsored by the magazine in creating this exhibition. They were shown quite honestly and frankly the beauty that could be attained by intelligent, imaginative design with a material inherently possessing both these attributes. All increments of the architectural, constructional, and decorative motifs were basically interlocked in the main idea of the designer, John Hill, architectural editor of *House Beautiful*, and his collaborator, Alfred Parker, A.I.A., to achieve a complex play of diamonds, triangles, and V lines.

The concrete units, in a variety of shapes and sizes, were laid in the wall on edge and set in different planes to create shadows and patterns, a somewhat radical departure from the familiar, flat, horizontal treatment usually followed in strictly utilitarian use. Rocklite Products, of Ventura, Calif., the donors of the concrete units, successfully integrated the overall color scheme into the individual units by skillful application of varying amounts of mineral pigment inclusions in the block mixtures as these were made. The result showed to a very marked degree the harmony possible between the architecture and the furnishings of the room.

This has proved to be one of the most successful promotional ventures ever undertaken by N.C.M.A.; and coupled with the tremendous coverage afforded by *House Beautiful's* ambitious presentation to its multitude of readers, it indicates that the efforts put forth by both sponsors was money and time well invested.

Many variations arise from this fresh use of square concrete blocks. Even the terrazzo tables and the rug blend well with them. The triangular table sections may be arranged in many interesting combinations or they may be used individually.

Missouri Products Firm Raises Output 100 Percent

Completion of an improvement program which has resulted in doubled production has been announced by the St. Joseph Concrete Products Company, Inc., St. Joseph, Mo. The main addition was a new concrete block-making machine and associated equipment.

The firm manufactures Haydite blocks, concrete blocks, culvert pipe, and other concrete products. Owners of the company are F. O. Davis and E. K. Sampson.

Manufacture of a wood-fibre, concrete-bonded roof decking material called "Tectum" has been started by the Marietta Concrete Corporation at its Newark, Ohio, plant.

One-Man Batching Controls Cut Costs, Improve Quality At Dry Mix Products Plant

AT THE Dry Mix Products Company's plant at Roseville, Calif., a remote-controlled, weighing-batching system for making up proportioned mixes of their bagged cement products is cutting costs and improving quality beyond expectations.

The company, organized in 1950 to furnish pre-mixed packaged cement-aggregate dry mixes for the demands of the growing "do-it-yourself" trend in home construction and repair work, commissioned the Richardson Scale Company of Clifton, N. J., to design and install a new proportioning system. It replaced a continuous, volumetric proportioning system in which vibrating feeders delivered materials to a standard screw conveyor. This conveyor, in turn, mixed and transported the materials to a bagging scale. The system turned out a fairly uniform product, but extra cement was usually required in the mix in order to be on the safe side of minimum strength.

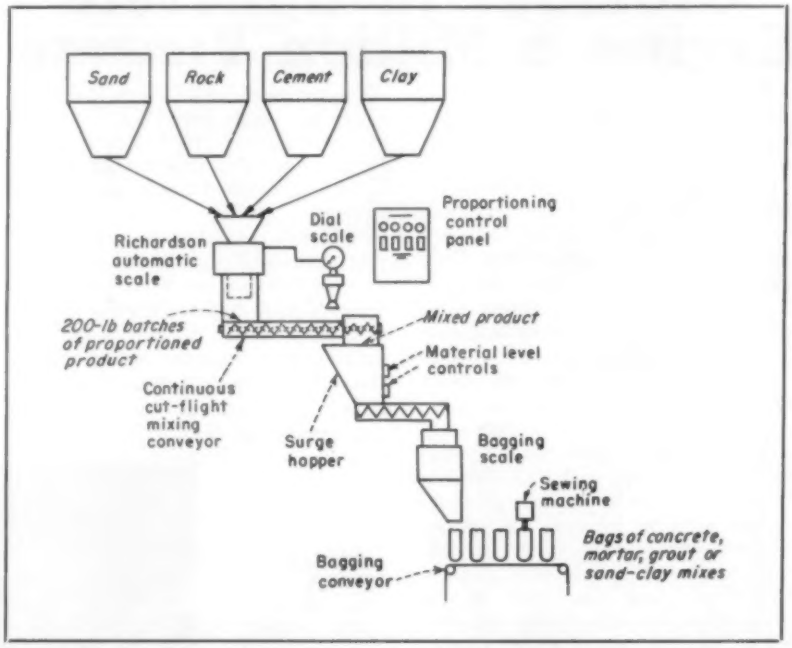
Items formerly produced included pre-mixed concrete, mortar, grout, and sand-clay mixes. The plant now turns out 16 additional types of mixes, including plaster, stucco, and soil conditioners, at the rate of 2,000,000 bags annually. All products are packaged in 60- and 90-lb. bags.

Component parts of the new installation are four 30-ton steel bins containing aggregates and cement, conveyors running from bins to an automatic scale, an electronically-controlled, dust-tight, automatic weighing unit with a scale dial hooked up to the unit, a continuous mixing conveyor, a surge hopper, a conveyor extending from the surge hopper to the bagging scale, and a high-speed bagging scale. Flow proceeds from bins to scale to mixer to surge hopper to bagging unit, as shown on the accompanying flow diagram.

The automatic scale is set by the operator to deliver a 200-lb. batch every 24 seconds to the mixing-conveyor, which is semi-continuous in operation. Small-batch proportioning by this method decreases the possibility of segregation. Production is governed entirely by the progress at the bagging level. The surge bin above the bagging scale is equipped with upper- and lower-level controls. The lower control locks the bagging scale unless sufficient material is present for an accurate weighing. The upper control interrupts the batching unit if the bagging operation lags.

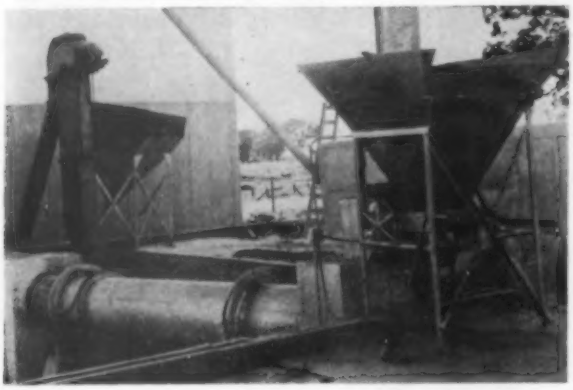
Equipment was selected with a view to the handling of each material used. Vibrating trays handle heated crushed rock, an air-operated gate the highly abrasive sand, and screw feeders the fluffy, finely-ground cement and clay. Feeding devices terminate in a small inlet chute above, but not connected to, the weigh hopper. A gas-heated 30-in., 25-ft. rotary dryer, located between the outdoor hopper and feeder and the indoor steel bins, removes all surface and absorbed moisture from the sand and crushed rock as they pass through the dryer. From this dryer aggregates are moved into any one of the steel bins by bucket elevator. Cement and clay, not requiring drying, are transported from the outside hopper by screw conveyor or

(*Continued on page* 219)

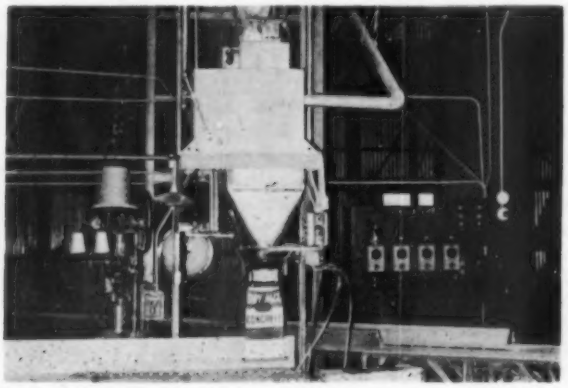


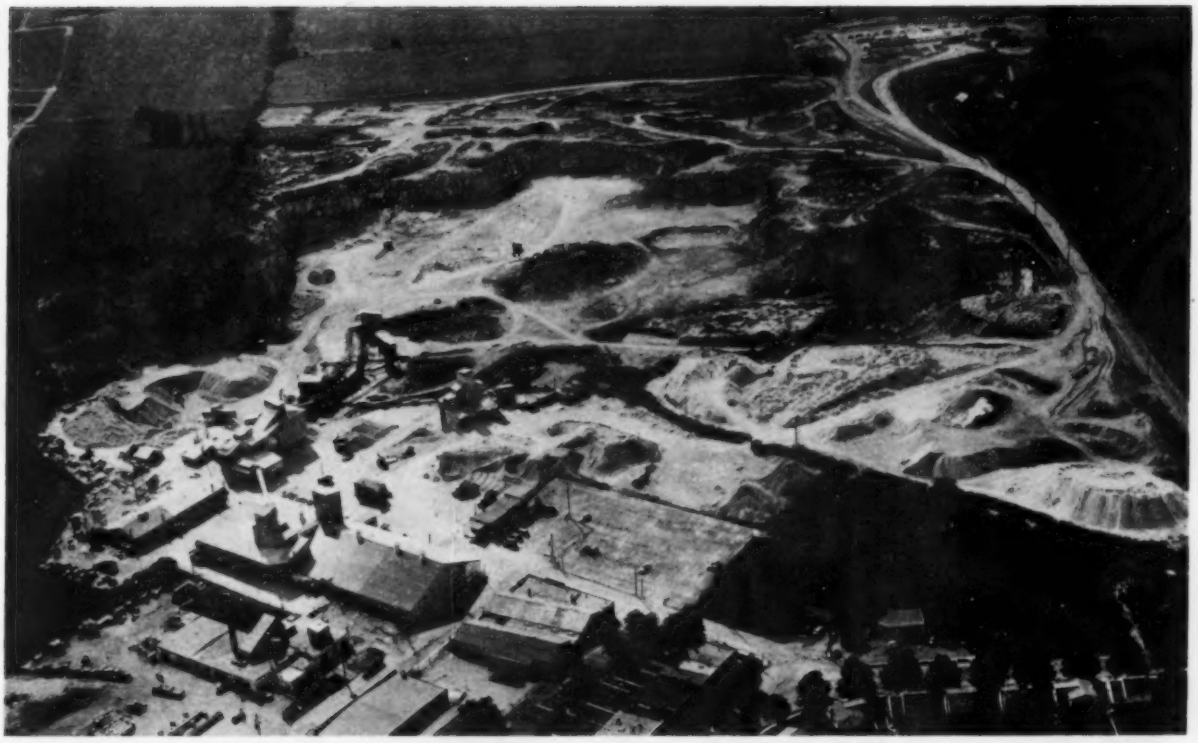
Above: Flow diagram of automatic proportioning at Dry Mix Products Company.

Below: Outdoor hopper and feeder, and 30-in. by 25-ft. gas-heated rotary dryer.



Below: Bagging scale and control board of weighing-batching system.





This aerial view shows all of the extensive quarrying and processing facilities of the York Stone & Supply Company, York, Pa. At the upper right is the most recent addition—a fine, well equipped block plant.

Eastern Firm Brings Quarry Know-How Into New Block Plant Venture

another ON THE SPOT report

SOME months ago there was described in considerable detail in these pages a unique setup for cubing which had just been placed in operation at the new block plant of York Stone & Supply Company, at York, Pa. In order not to detract in any way from what we regarded as an outstanding story on handling and cubing, we elected at that time not to present information concerning other facilities in the plant, even though these in their way are quite as noteworthy as the cubing setup itself. It is, at any rate, the purpose of this discussion to present a general description of what we believe is one of the finest block plants built in recent years.

Outstandingly successful for some years in the crushed stone business, the York organization brought a wealth of sound "know-how" to the concrete products business when the block plant was completed and placed in operation last year. The new facilities were located on property adjacent to the company's extensive stone quarry on the outskirts of York. The quarry organization furnished labor and supervision for the entire project.

The site of the block plant is actually the overburden dump for the quarry—with some 50,000 cu. yd. of additional fill used in the construction of a 400 ft. long, 7 percent ramp to take advantage of the natural gradient to accomplish true gravity flow as far as the mixer. This ramp is used to truck screenings, ¼-in. crushed stone, and cement to the plant storage bins. It is also used in shuttling cinders from an adjacent stockpile to the bins by means of a Wagnermobile front-end loader; and finally it is used extensively as a means of disposing of over-burden.

Adjacent to the block plant proper the ramp is supported by an extensive reinforced concrete retaining wall. This structure has seven piers which go down to solid bed rock—three in the center section and two in each of the wing walls. The trucks dump directly into the bins, which are roofed over and enclosed on the sides for protection from the weather. Cement is hauled from the rail siding two miles away with a special covered truck which carries approximately 8 tons per trip.

The bins were supplied by Butler, and are free-standing with no ties to the building structure. There are four compartments—three for aggregates (cinders and two sizes of stone) and one for cement. Each of the aggregate sections holds about 120 tons of material, while the cement compartment accommodates about a carload and a half, or around 550 bbl. With this capacity, it is possible to fill the bins on the day shift and operate a night shift without additional charging.

Butler also supplied the automatic weigh batcher, which is mounted on a traveling carriage in order at some future time to serve two mixers. The present single-mixer installation consists of a 50-cu. ft. Besser batch unit mounted in a shallow pit just below plant floor level.

York's blending and mixing procedures are conventional, with one

notable exception. A detergent chemical (Johnson-March Compound M) is being used at the mixer as a means of dust control and as a plasticizer. Although this material is manufactured and marketed as a dust inhibitor, it appears to serve admirably as an air-entraining agent when used in concrete mixes. York's experience seems to indicate that some additional strength is also imparted to the block.

The chemical is pumped from a small storage tank located in an adjacent room to spray nozzles mounted directly over the mixer, and the sprays are turned on when the aggregates and cement are discharged from the batcher into the mixer. There follows a brief period of dry mixing before the water addition is made.

The block machine is a Bergen Tri-Matic, which is operated at 761 units per hour. This is believed to be one of the first block machines of that make to be operated on a production basis, and the York firm reports that it is well pleased with its all-round performance.

Both the installation and operation of the block machine are conventional, except in respect to the feeding of pallets. For this operation York has built to the right of the block machine a chain-conveyor device by means of which empty pallets are removed from the curing racks mechanically and fed into the pallet magazine at the rear of the block machine. The device is of sufficient height so that it can strip the topmost pallets from a standard 72-block rack resting on the forks of a conventional lift truck. The lift truck positions the rack so that dogs mounted on the conveyor chains engage the bottom pallets; then it lowers the racks in stages to remove the pallets from the remaining tiers above. At the time of our visit racks were being cleared of pallets at the rate of about one per minute, but the company felt confident that eventually the time would be decreased to about half a minute per rack.

View from the truck ramp shows the large storage yard, the cubing shed in the background, and at the right the plant proper and the enclosed storage bins.

The York plant is set up for conventional high-temperature-steam curing in a battery of six kilns, each of which accommodates 34 72-block racks, or 2,448 8-in. equivalent units. The rooms open at both ends, and they are equipped with Universal Door Carrier doors. Steam is furnished by a 100-hp. Powermaster oil-fired (gas-ignited) automatic boiler.

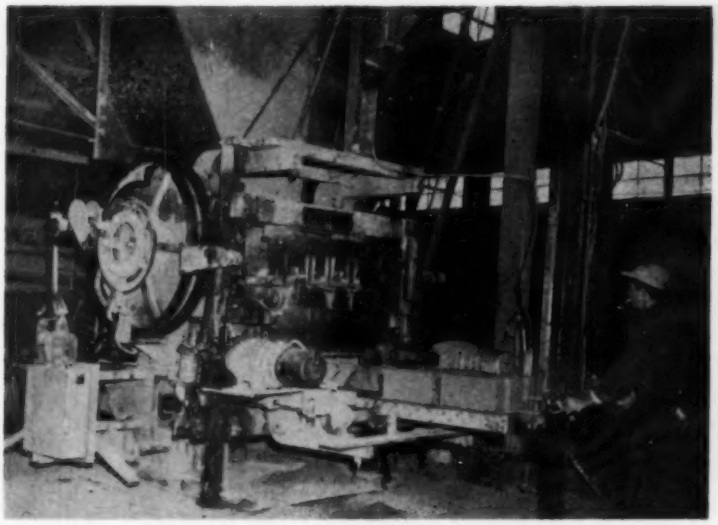
Automatic timers control the curing cycle on each of the kilns. After a 2-hour presetting period the steam is turned on for 3 hours, during which a maximum temperature of 140 to 155 deg. F. is attained. This is followed by at least 3 hours of soaking when the plant is operating two shifts per day, and a longer period when there is only a day shift to provide for.

In the interest of maintaining uniform quality and maximum efficiency, York right from the start adopted the practice of testing its own output. Units are regularly broken at the age of 1, 3, and 7 days, (occasionally at 28 days), using a Forney compression testing machine. Blocks are provided for this purpose by marking one or two racks at random each week, and removing 6 to 8 units from these racks at the end of the curing cycle.

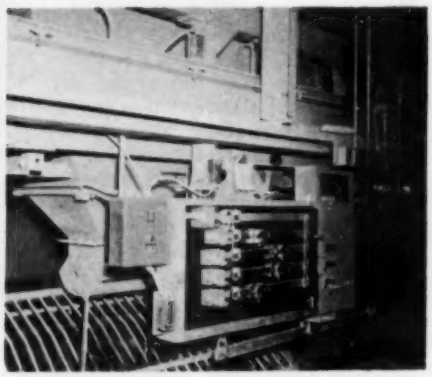
The machine room of this modern plant measures about 66 by 96 ft., this area including space partitioned off for the boiler room and an adjacent locker room. The present block machine is centrally located, leaving ample room for the future location of a second machine on one side, and for related machine operations on the other side. In this case the "related machine operation" consists of an efficient and exceptionally well-engineered setup for the manufacture of concrete lintels. The operation centers around a 10-ft. 8-in. Kent Super Lintelator machine, complete with its own batch mixer, skip hoist, overhead concrete hopper,

The company built this sign using its own product—conventional 8- by 8- by 16-in. concrete masonry units.

This attractive exposed concrete block office building located adjacent to the plant building helps sell the product.

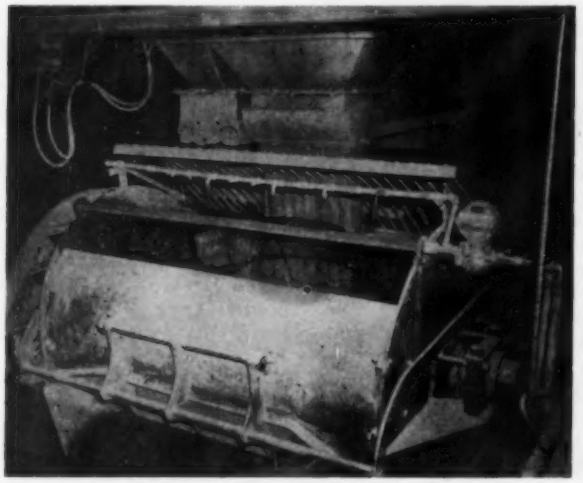


Left: View of the high-production block machine, one of the first of its make to be installed. Although the entire plant design is based on the operation of two machines, only one was installed initially.

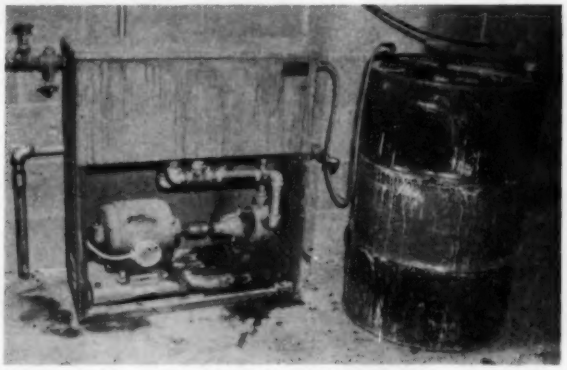


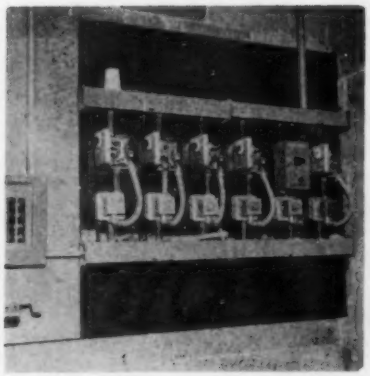
Above: The traveling weigh batcher which serves the mixers used in block and lintel production.

Below: View of the 50-cu. ft. mixer. The pipe and spray nozzles above the water line are for introduction of a detergent which acts as both a dust inhibitor and a plasticizer.



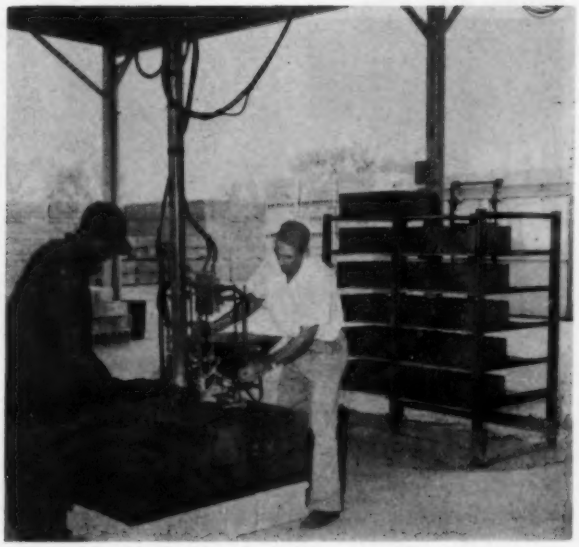
Below: Arrangement of drum, tank, and pump for handling the chemical detergent.





The battery of timers by means of which steam is cut off from each of the kilns at a predetermined time.

Shown here are the bridge crane hoist and the 7-ft. diameter turntable, which cube units at the rate of about 12 racks per hour.



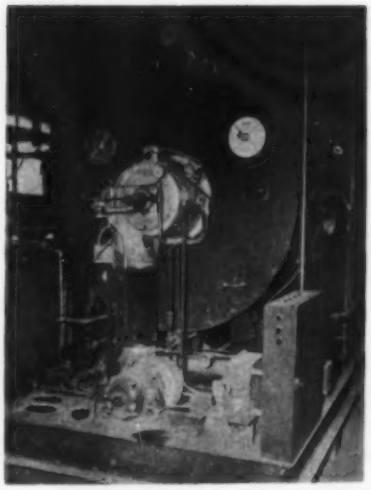
and off-bearing hoist. The same traveling batcher which serves the block machine mixer also serves the mixer which supplies the Lintelator. Lintels are made in widths of 3⅜, 7⅝, 9⅝, and 11⅝ in. and in varying lengths up to 10 ft. 8 in.

For the benefit of readers who may have missed our earlier story on York's unique setup for cubing, the following brief description is given. All cubing operations are concentrated in a 40- by 80-ft. roofed shed. This structure stands 25 ft. away from the doors through which the curing kilns are unloaded. Its main features consist of two 7-ft. diameter Chase motor-driven turntables located side by side in the floor, and a ⅜-ton Besser overhead bridge crane from which is suspended an air-operated clamp-type off-bearer.

The function of the turntables is to rotate the racks in order to provide access to the tiers of pallets on each side. Except that in this application the operation consists of unloading, the turntables serve the same purpose as when they are located in front of a block machine.

The motor-driven tables are large enough to accommodate standard 72-block racks without careful spotting by the fork truck operators. Rotation is controlled by two sets of forward, stop, and reverse pushbuttons mounted on the frame of the off-bearer. Thus the operator has finger-tip control of the positioning of the racks as he unloads them.

Racks are delivered from the curing kilns directly to the turntables in the cubing shed. The cubes are formed immediately behind each turntable, allowing only enough clearance to permit maneuvering.



The 100-hp. oil-fired (gas ignited) boiler which supplies steam for curing and space heating.

The usual procedure is to start with a full rack on each turntable. Clearing pallets from one side of one rack, the operator switches immediately to the adjacent rack while the first one is being rotated. This staggered use of two turntables makes it possible to cube 14 racks of 8-in. units in an hour.

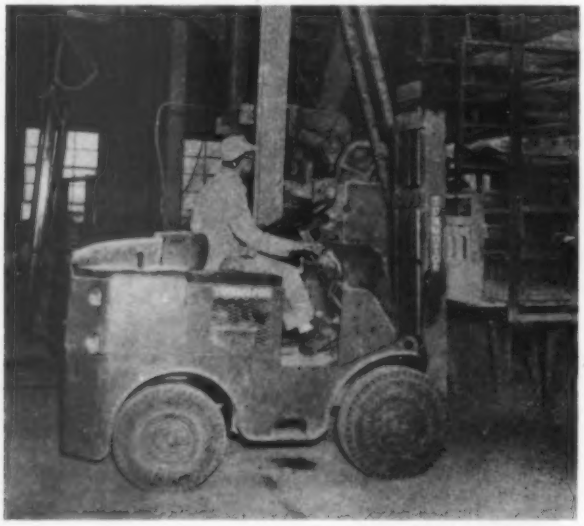
All block are handled in cubes, the bottom courses of which consist of 8-in. block in lieu of pallets for fractional units. Fractional cubing is speeded up considerably by placing *three* courses of 8-in. pallet block behind the turntables. When the first cube has been built, the lift truck removes it with just the top course of 8-in. block, and a new cube is immediately formed upon the two remaining courses of 8's. By proceeding in this manner three cubes can be formed before it is necessary to use the fork truck to place additional pallet block.

The company's standard cube of 72 block consists of an equal number of regular 8-in. units, sash units, and pier block. This cube is formed in such a way that the fork trucks can readily pick up 24, 48, or 72 units at a time, and yet the composition of the partial cubes remains the same as that of the whole cube. This practice is said to result in greater flexibility of delivery operations, since it permits more efficient loading of many types and sizes of trucks. Customers like the arrangement because the combination of standard, pier, and sash block in each cube takes care of all usual requirements, with the exception of half block. Company officials believe that there is a saving in overall handling costs.

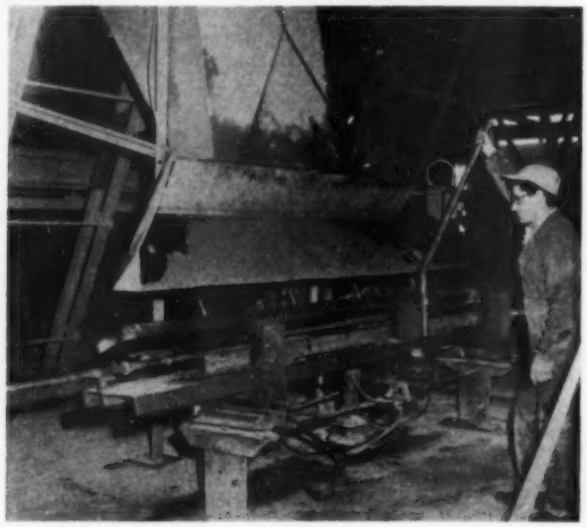
The cubing shed is in the approximate center of a 300- by 300-ft. paved storage yard. Its arrangement in the general plant layout virtually eliminates lift truck cross traffic and all the confusion and safety hazards which usually accompany such cross traffic. Since most of the present shed is needed and used for operations and storage directly connected with cubing, the company plans eventually to provide more covered storage.

Aside from the lintel operation, seven men are employed in direct production, handling, and loading at the York Stone & Supply Company. In addition, there is a superintendent and an office man. Officials of the company are George L. Cramer, president, Frederick W. Cramer Jr., vice-president, and Amos Raffensberger, secretary and treasurer.

One of the fork lift trucks unloading pallets from a rack by means of a special conveyor described in this article.



View of the vibrating machine used in the manufacturing of lintels. The installation has its own mixer, skip hoist, overhead hopper, and power off-bearer.



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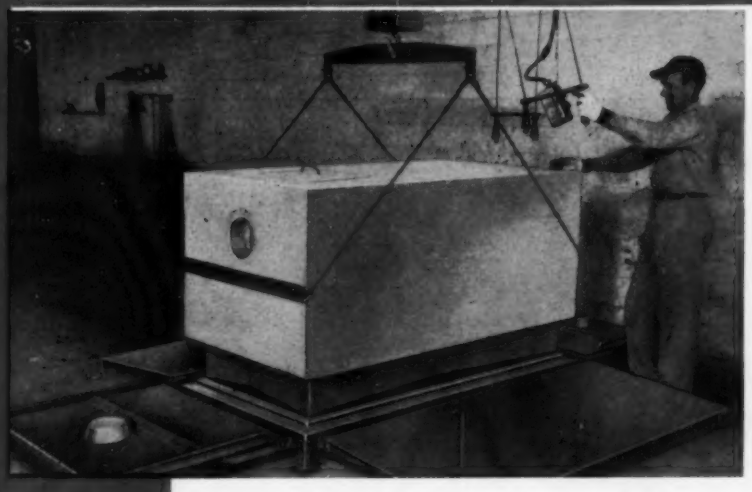

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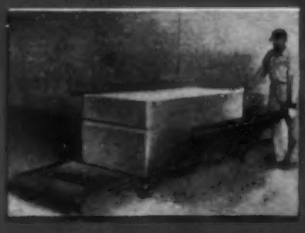

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How Concrete Pipe Is Manufactured

For the following article PIT AND QUARRY is indebted to the American Concrete Pipe Association. With the permission of the association we reprint Chapter II of the *Concrete Pipe Handbook*, an A.C.P.A. publication.—The Editors.

AN extremely dry mix of cement, sand and gravel or broken stone, and water with or without additions such as fly-ash and/or air-entraining agents is used in the manufacture of concrete pipe. In the cast and vibrated pipe the slump often approaches zero as determined by A.S.T.M. Designation C143: "Standard Method of Slump Test for Consistency of Portland Cement Concrete". In the machine-made packerhead and tamped pipe, the slump is often less than zero, meaning, of course, that there is less water in the mix than required to give zero slump. In centrifugated pipe the water is forced out by centrifugal action to give whatever water-cement ratio is desired, the result generally being a slump near zero. Thus, in all methods of making concrete pipe the resultant mix has a very low water-cement ratio.

Density in the case of the cast and vibrated pipe is obtained by means of high-speed vibrators attached to the outside of the form or applied directly inside the form, or both. Modern high-speed vibrators are used with very small amplitude and very high speeds. Often the speeds are in excess of 8,000 r.p.m., and this high speed is obtained electrically or by using air activated vibrators operated by 100 p.s.i. (or more) air pressure.

Density in the cases of the machine-made packerhead or tamped pipe is obtained by actual mechanical compaction of the mix when in the machine. By adjusting the mechanisms the desired mechanical compaction can be obtained.

Density in the case of the centrifugated pipe is obtained by centrifugal action, the result being determined by adjusting the speed of rotation and the method of manufacture.

The weight per cubic foot as a measure of density indicates that where conventional concrete might weigh 145 pounds per cubic foot, the concrete pipe with the same aggregates might weigh as high as 160 and even 165 or more pounds per cubic foot.

Compressive strength of conventional concrete is determined by A.S.T.M. Specification Designation C39: "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders"; A.S.T.M. Specification Designation C192: "Tentative Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory"; and A.S.T.M. Specification Designation C31: "Standard Method of Making and Curing Compression and Flexure Test Specimens in the Field." Unfortunately these standard compressive strength tests do not indicate correctly the compressive strength of concrete as produced in commercial concrete pipe. The special dry mixes, combined with the special high-speed vibration, mechanical compaction, and centrifugations, produce concretes with compressive strengths far in excess of those indicated by the above-mentioned standard A.S.T.M. compressive strength tests for conventional concrete.

The actual compressive strength can be obtained more accurately by coring test samples from the completely cured concrete pipe. A.S.T.M. Specification Designation C42: "Standard Methods of Securing, Preparing and Testing Specimens From Hardened Concrete for Compressive and Flexural Strengths" can be used to obtain these values.

Compressive strength of cored cylinders taken from cured and completed concrete pipe give surprisingly high values. Compressive strengths in excess of 5,000 p.s.i. are commonplace and those in excess of 6,000 not unusual, while some compressive strengths are double what would be expected in the conventional types of concrete.

Design of the Mix

A discussion of the design of mixes for use in the manufacture of concrete pipe presupposes a knowledge of the design and control of concrete mixes for the conventional type of concrete structures. As stated in the *Report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete of A.S.C.E.*, published in *Proceedings*, Part 2, June 1940: "In such structures as arches, tanks, reservoirs, chimneys, etc., where specialization relates principally to the design and details of construction, the general provisions of the report may be applied with the modifications necessary to suit the special conditions." One must know the principles of design for the conventional concrete but the modifications are of the utmost importance in making concrete pipe.

The design of concrete mixes for conventional concrete has received a great amount of study over a long period of time. Rene Feret in France in the 1800's laid the foundation which was followed in this country by William B. Fuller, Sanford E. Thompson, Duff A. Abrams, A. N. Talbot, Roy W. Crum, Stanton Walker, Franklin K. McMillan, A. T. Goldbeck, and many others.

Basic principles of design of mixes may be found in standard textbooks, in the publications of the Portland Cement Association, The National Ready Mixed Concrete Association, The American Concrete Institute, The Bureau of Reclamation, and elsewhere. A thorough study of such source material should be undertaken before attempting to design a mix for . . . concrete pipe.

The modifications of the conventional designs to adapt them for the production of the superior concrete produced in concrete pipe are the property of the concrete pipe manufacturers who have worked them out over the years. There is very little published material on the subject.

For the conventional design of mixes the procedure is as follows:

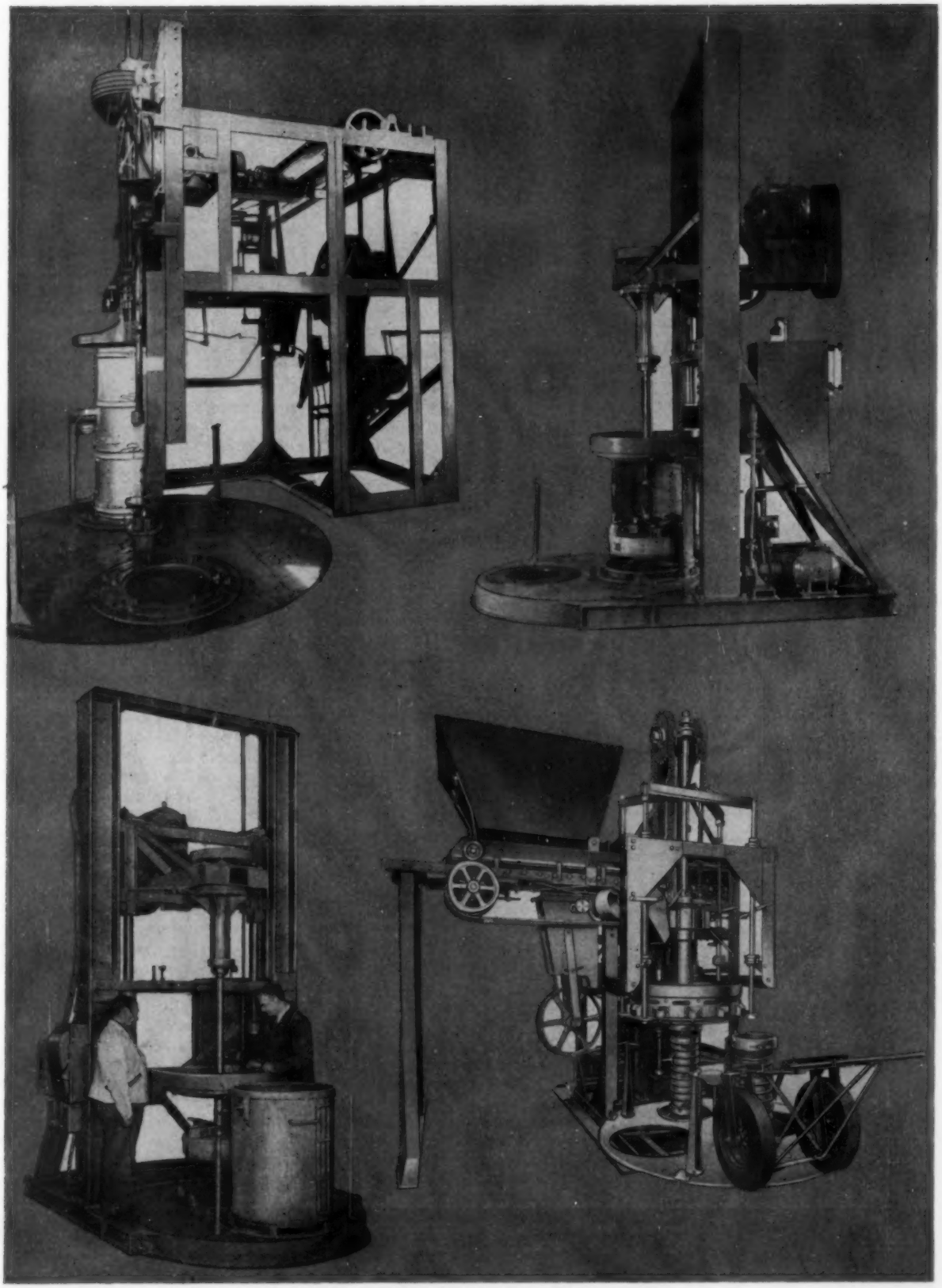
(1) Select the desired water-cement ratio
(2) Select suitable consistency
(3) Determine the maximum size of aggregate
(4) Experiment with a trial mix
(5) Make adjustments in succeeding batches in the light of compressive tests on concrete cylinders.

For the best results observe the following suggestions:

(1) Use suitable materials
(2) Measure accurately
(3) Mix thoroughly
(4) Use a workable mix
(5) Place properly
(6) Cure adequately
(7) Test samples to confirm quality.

The criteria by which to measure the success or failure of the design are these points:

(1) Strength
(2) Durability
(3) Impermeability of the resulting concrete.



Machines used to manufacture concrete pipe by the packerhead method.

High-strength concrete is generally durable and impermeable concrete, provided that the ingredients are sound; thus, the strength of the resulting concrete is probably the most important indication of the success of mixture design.

The factors that may be expected to affect the compressive strength are rather numerous. Among these in the order of their importance are:

(1) The amount of cement hydrated
(2) The water-cement or void-cement ratio
(3) The properties of the aggregate, including especially the surface conditions which may determine the mechanical bond, and the specific adhesion of the cement itself
(4) Workability of the mix which is a factor in securing good packing and in lessening accidental errors
(5) Structural features that are not properly understood, including the arrangement of particles in arches and the keying effect of large particles resisting the development of planes of weakness
(6) Irregularities in grading which produce humps in the grading curve.

The fundamental law in the design of concrete mixes stated by the Portland Cement Association and known as the water-cement ratio law is as follows:

"For plastic mixtures, using sound and clean aggregates, the strength and other desirable properties of concrete under given job conditions are governed by the net quantity of mixing water used per sack of portland cement.

"Designing a concrete mix, therefore, consists in selecting the water-cement ratio which will produce concrete of the desired resistance to exposure and the required strength, finding the most suitable combination of aggregates which will give the necessary workability when mixed with portland cement and water in this ratio."

When a tentative mix design has been determined upon, trial batches are run to determine workability, and test cylinders are made, cured, and broken at 7, 14, and 28 days to determine the strength being obtained.

Every project will have a slightly different mix design because the aggregates are different, and in the final analysis the conventional design of a mix is arrived at very much as our grandmothers arrived at recipes for making cake. With a few basic ingredients and principles and by trial and error, recipes were arrived at which turned out the desired product.

Special Conditions Pertaining to Concrete Pipe

In applying the above principles to concrete pipe there are special factors which will govern the mix design, such as the need for a very, very dry mix . . . the need for special properties of workability . . . the need for great strength using small-size aggregates . . . the need for passing strict absorption and hydrostatic tests with a thin-walled product, and the great importance of durability.

Dry mix: By the nature of the pipe-making machinery, the mix must be dry in order to permit stripping of the forms and using them over and over without unnecessary delay. Instead of worry about an excess of water, it is often necessary to guard against not having enough water to hydrate the cement.

Workability: Workability is of greater concern than in the conventional type of concrete because the pipe walls are relatively thin; because there is reinforcing in the thin walls; because the mix is packed, tamped, vibrated or centrifugated into place instead of flowing into place by gravity as in the conventional concrete.

Strength: Strength is of special importance because the relatively thin walls necessitate the use of small-size aggregates. In other words, strength must be obtained with small-size aggregates and without sacrificing plasticity or workability. Thus, special emphasis must be placed on using the largest amounts of the larger of the small aggregates consistent with plasticity workability.

Hydrostatic test: By experience it is known that there is a definite relationship in the relatively thin-walled concrete pipe between impermeability and the type of grading of the aggregates. The type of grading influences both the strength and the percolation.

Most substances, both metals and nonmetals, are dissolved more or less rapidly when exposed to the solvent action of chemically pure water. In many cases this action is very slow, indeed. If concrete permits the passage of water, it exposes the full thickness of the shell to this slow solvent action. Thin sections of concrete must be dense and impermeable and must restrict the passage of water. If this is not the case, leaching action takes place and disintegration follows.

Durability: As in the percolation test, there is a relation between the grading of the aggregates and durability. This also has been found by experience.

All these factors need special consideration in the design of concrete pipe mixes: the balance between sufficient water, adequate workability, and proper proportioning to give strength, impermeability, and durability. Very little has been published on the subject. In a sense, each manufacturer has worked out his own mix design by the trial-and-error method to give a product meeting rigid tests such as the A.S.T.M. three-edge bearing and ultimate tests, the A.S.T.M. hydrostatic test, and the A.S.T.M. absorption test.

As each concrete pipe plant will have a different aggregate and hence a different mix, it is impossible in a textbook to lay down rigid laws. In no case should the consumer specify both the requirements of the finished product and the mix to meet those requirements. If the engineer-consumer will state the requirements of the finished product, the manufacturer will use his special skills and knowledge and make a mix design to meet the requirements.

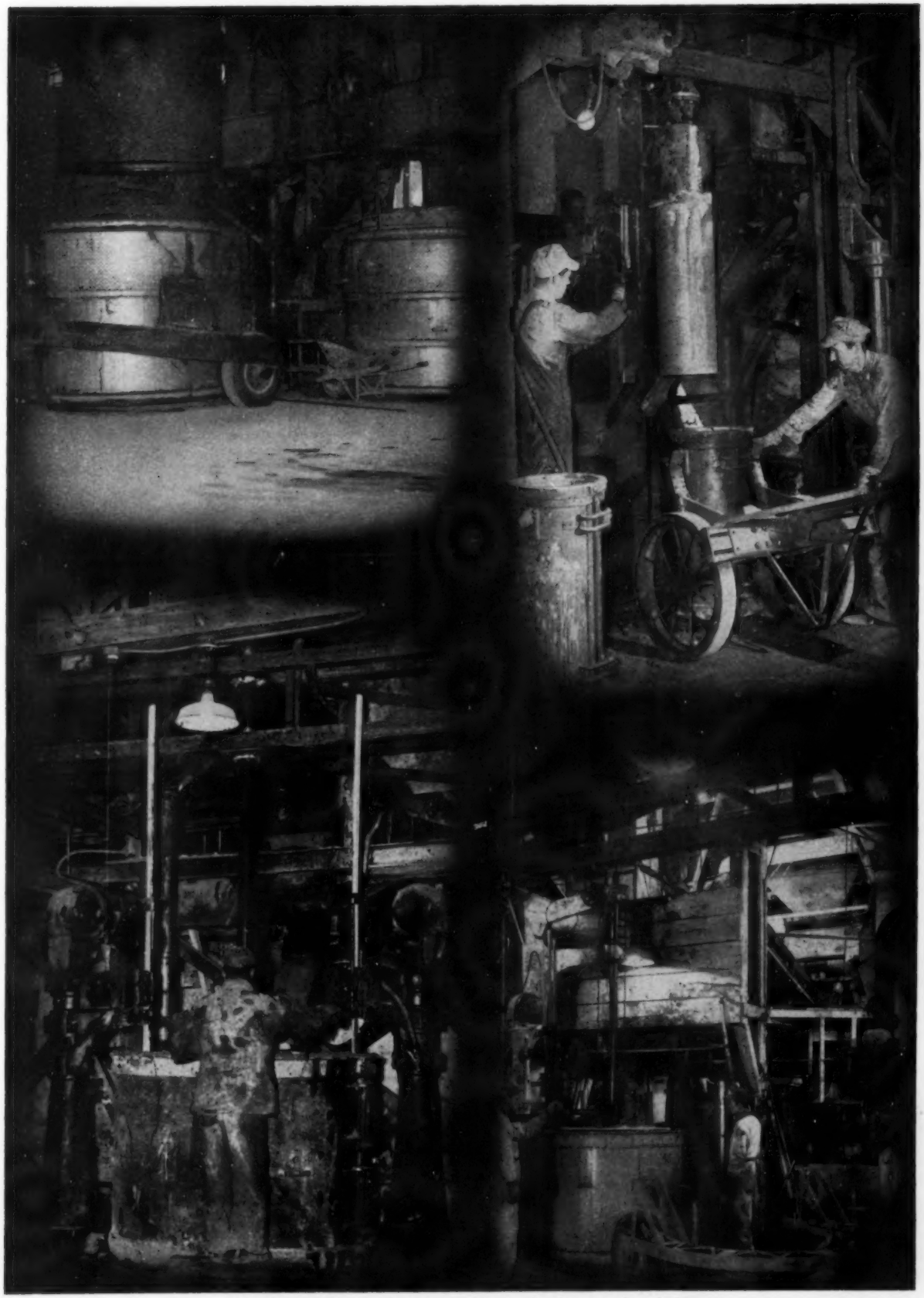
The industry takes pride in stating that the concrete in concrete pipe is probably the finest concrete, by any standard, made commercially anywhere in the world.

Cast and Vibrated Pipe

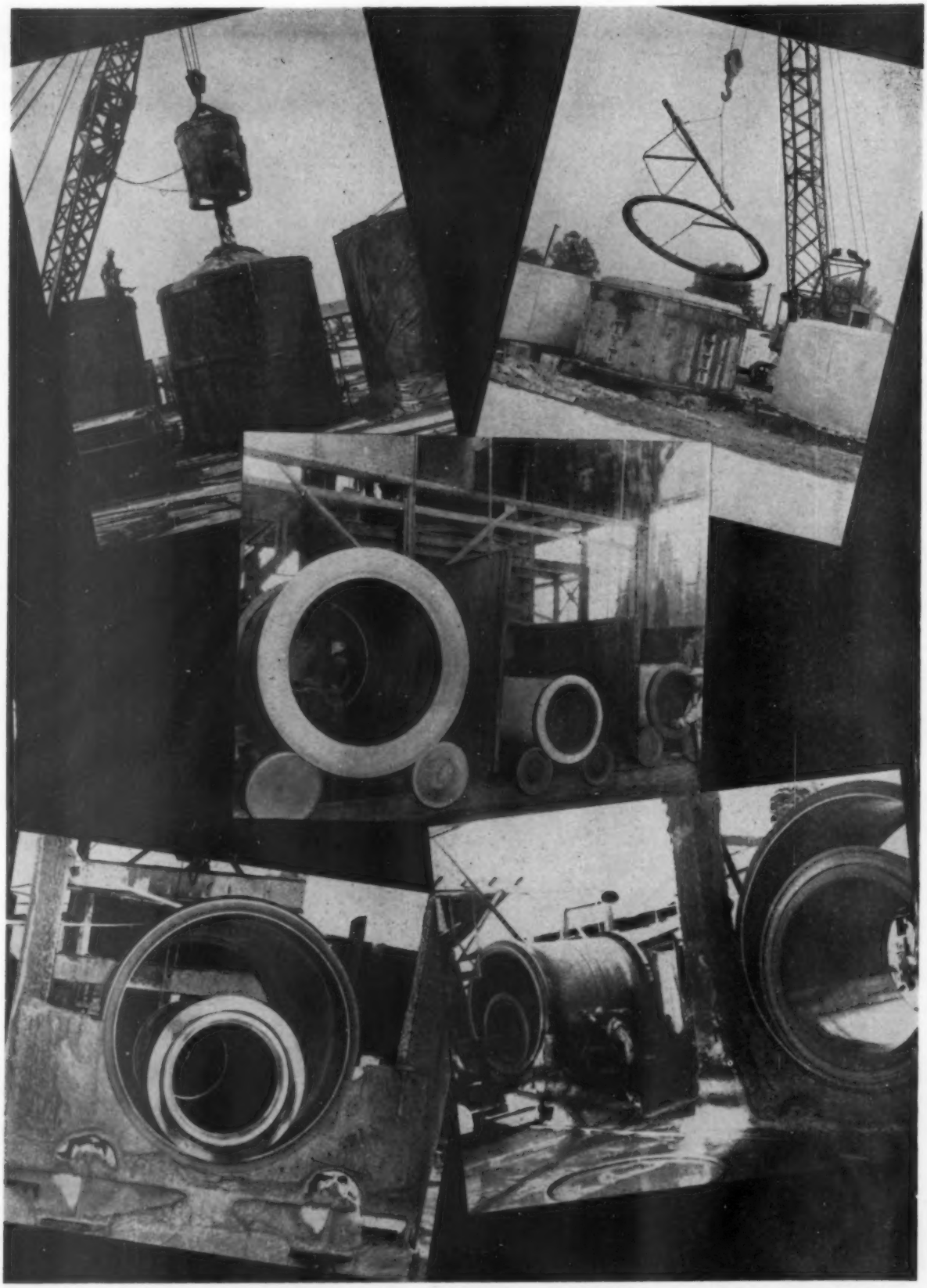
Cast pipe is made by the conventional method of preparing the mix and placing it in forms of the desired sizes. The dry mix is compacted by means of electric or air-activated vibrators, either attached to the outside of the form or applied directly to the concrete inside the forms. In this process the vibrating method has been highly developed to expel trapped air completely and to give the desired density and the desired smooth finish both on the inside and outside of the completed pipe.

Machine-Made Packerhead Pipe

The packerhead method of manufacturing concrete pipe derives its name from the revolving packerhead on the machine which literally packs the dry mix into place in the pipe wall. At the start of the process the packerhead is at the bottom of a vertical form which makes up the outside form of the finished pipe. As the packerhead revolves at high speed, the dry mix is fed into the form and the packerhead is raised while revolving. Thus, the packerhead packs the mix into place under pressure. The outside diameter of the packerhead is the inside diameter of the finished pipe. The mix is so



Machines used to manufacture concrete pipe by the tamped method.



Top two pictures illustrate the manufacture of concrete pipe by the cast and vibrating method. Lower three illustrate manufacture of concrete pipe by the centrifugal method.

dry and the force with which it is packed against the outside form is so great that the freshly made pipe section can be taken immediately to the curing shed, where the outside form is stripped and the green concrete pipe stands vertically during the curing and hardening period.

The packing action of the packerhead packs the mix into the density required, at the same time giving a troweling action which makes for a smooth inside finish so desirable from a hydraulic standpoint.

Machine-Made Tamped Pipe

In the tamped pipe-making machine the dry mix is tamped into the form by blows from hard wood tampers fitted with metal shoes and striking at the rate of 500 to 600 times a minute. In this machine the inside core generally remains stationary while the outside form revolves. As the outside form revolves, the dry mix is fed into the space between the outside form and the core and the tampers tamp the mix into place. Ingenious devices maintain uniform pressure in the tamping blows, at the same time allowing the tampers to travel upwards as the pipe walls are built up. A uniform amount of mix is fed into the revolving form all the while it is being subjected to this rapid heavy pounding and in this way the pipe is built up until finished. Upon completion, the machine lifts the core or inside form and the pipe is ready to be taken to the curing room, where the outside form is stripped. The outside form and base rings are so designed that when the form latches are loosened, the weight of the form causes it to drop free from the pipe and allows the form to be removed without injury to the newly made pipe.

The blows of the tamper pound the mix into the desired density while the troweling action of the concrete turning around the stationary core adds the smooth finished surface to the barrel.

Machine-Made Centrifugated Pipe

Centrifugal concrete pipe is manufactured in forms rotating at high speed in such a manner that the centrifugal force compacts the concrete during the time it is being placed, meanwhile forcing out excess water content. There are several methods for manufacturing centrifugal pipe, each employing the centrifugal principle of compacting the mix. Also, there are several different types of centrifugal pipe, each designed for a different purpose—plain centrifugal pipe, reinforced centrifugal pipe, reinforced centrifugal pipe prestressed by wrapping with high-tensile steel wire, centrifugal concrete cylinder pipe (centrifugal concrete pipe on the inside of a steel cylinder used as a form and coated with concrete on the outside), centrifugal concrete cylinder pipe prestressed, and centrifugal concrete cylinder pipe prestressed and reinforced on the outside.

In spinning the pipe, the concrete is placed in the inside of the mold while it is spinning and in the case of the cylinder pipe, the steel cylinder mold becomes an integral part of the finished pipe. The centrifugal force compacts the concrete and forces the excess water to the inside, where it passes off with the slurry, leaving a dense concrete of surprisingly high compressive strength.

Reasons for the Different Manufacturing Methods

The development of the different methods of manufacturing concrete pipe as described above, along with many variations thereof, is a credit to the ingenuity and engineering ability of the industry. Many factors enter in which would indicate that under certain conditions one method may be preferred over another.

It is the duty of the engineer-consumer to specify the characteristics needed in a given concrete pipe project. With a given set of specifications, it is then the duty of the concrete pipe industry to meet those specifications, using the method or variation which is most advantageous and economical.

One-Man Batching Control

(*From page* 208)

bucket elevator to their respective bins.

Mixing costs have been cut in the new system by proportioning more product with less labor. One man at the control board now weighs out 15 tons of mixed product per hour, and in connection with this work sometimes changes formulas two or three times each day. The system eliminates waste and thus reduces materials costs. It offers quick changeover, thus lowering overall production costs and permitting a more flexible operation. As stated previously, it reduces the extra amount of cement, previously required when the proportioning was inaccurate.

Quality control of the end products is maintained because the new system permits absolute mechanical control over the weighing process, and because the batch weighing system is better than 0.1 percent accurate. Comparatively, weigh-feeders are in the order of 1.0 percent, and volumetric systems average about 2.0 percent. Pilot lights on the control board inform the operator of the progress of the feeding, weighing, mixing, handling, and bagging processes at any time. Should anything go wrong, he can re-set or re-run the entire operation or any part of it. As previously shown, the absence of segregation results in a uniform product, high in quality.

Raw materials used in the manufacture of the various products are obtained from several sources and all are brought to the plant by truck. Sand and crushed rock are deposited in two 100-ton outdoor storage bins. A scoop loader is used for transporting the material from these bins to the outdoor hopper and feeder.

New Concrete Block Plants Opened in Several Areas

New concrete block plants—all of them using the most modern equipment—have been reported at various locations, among them the following:

The Clemco Concrete Products Company's new plant at Colfax, Iowa, which opened in May; the new plant owned by George Shaw, of Little Rock Wash, Calif., with a capacity of 500 units per hour; the Northeast Block Company, Petoskey, Mich., operated by Giles Schmitt, Carl Schmitt, and Ray Beavers; the Cambridge Concrete Products Company, Cambridge, Md., owned by Peter Maynard.

At other plants, the installation of up-to-date machinery has vastly increased capacities. Five employees at the Linza Graham plant, Scottsburg, Ind., produce 4,000 units daily, as compared to the 1,300 units formerly produced by seven men before plant modernization.

Another illustration is that of the H and S Concrete Products Company of Richfield, Utah, where the installation of a new machine increased capacity from 1,500 units per day to 5,000 daily. New conveying systems and curing rooms have also been added at this plant.

The National Labor Relations Board recently reversed its former position and followed the views of the Ninth Circuit Court of Appeals, which ruled that employers engaged in multi-employer bargaining may lawfully establish a joint lockout when a union calls a strike against one employer in the group during contract negotiations.

Ready-Mix Firm Uses Immersion Tube Heater for Winter Operations

TO accelerate the setting of concrete after pouring from transit-mixing trucks during cold winter weather, the Wel-Don Concrete Corporation of Westfield, N. J., has an effective means of heating the water for the mixing trucks at its ready-mix concrete plant in Fanwood, N. J.

The sand and gravel are not separately heated, any frozen lumps contained in these materials being thawed out by the hot water during mixing. Operating with a fleet of 20 Mack 10-wheel type, 6-cu. yd. units for transit mixing, the plant capacity is 750 cu. yd. of concrete per day.

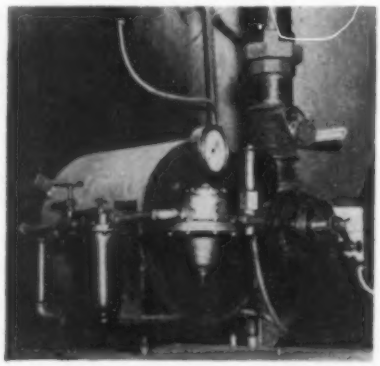
As devised by Alexander Genard, general superintendent of the plant, the water heating arrangement provides for ample heating capacity and storage without interruption of plant operations. It is economical in fuel consumption and does not require operation before or after plant hours. Because of the tank storage capacity, insulation, and efficient method of heating, hot water is always available as needed.

The installation has an immersion tube-fired 20,000-gal. water tank, 32 ft. long by 10 ft. in diameter with a main firing tube 12 in. in diameter leading into two 10-inch diameter return flues. The oil burning system has a No. 782 Hauck Proportioning Oil Burner with a 3-hp. 16-oz. blower, a ¼-hp. oil pump, and a Wheelco Electric Eye and Flame-otrol with a manual reset relay and a Minneapolis-Honeywell Aquastat.

Water is heated during the same time that it is being used from the tank and during simultaneous refilling of the tank. The desired water temperature in the tank is 160 deg. F. during very cold weather and about 145 to 150 deg. for less severe days. The heated water from the tank flows by gravity to the loading stations for the mixer trucks.

Capacity is sufficient to heat 10,000 gal. of water from 32 deg. F. to 165 degrees F. The tank is insulated all around with a 3-in. thickness of magnesia block and asbestos cement with wire reinforcing, and there is an overnight loss of only 4 to 10 deg. F. in water temperature. Ends of the tank are left uncovered to warm up the inside of the building in which the tank, water pump, and oil burning system are located.

The amount of water used during the morning causes the contents of the tank to drop to about 14,000 gal. by about 11:30 o'clock in the morning, when the burner is started. While the burner is firing, a pump is refilling the tank at the rate of 2,000 gal. per hr., and at the same time heated water is being used at the rate of 1,000 gal. per hr. by gravity flow to the plant. The burner consumes about 12 gal. of oil per hr. for five hours, making a daily oil consumption of approximately 60 gal. By 4:30 p.m., the tank contains 19,000 gal. of heated water at 165 deg. F. temperature, and at this time the burner flame is shut off automatically by means of the Aquastat, which actuates a solenoid oil shut-off valve. An electric eye flame safeguard then causes the burner blower and oil pump to shut down. The burner does not start again until a manual reset relay is operated for subsequent manual relighting. With the electric eye flame safeguard, and Aquastat control, the burner operates without any labor supervision after starting.



● This automatic oil burner heats water in a 20,000-gal. tank by means of a 12-in. main firing tube which leads into two 10-in.-diameter return flues.

The rapid and clean combustion characteristics and the proper flame pattern of the oil burner have proven ideal for the immersion-tube firing system of the tank. There is no smoke and no soot formation. Proper oil-air ratio is maintained over the entire range of the burner by means of the automatic proportioning feature. The immersion-tube heating system gives fast and efficient transfer of heat because the firing tube is always surrounded by water to be heated. The burner is mounted on a short, steel-jacketed refractory ignition tile with a spacing for induced air intake, outside the tank.

The heated water is also used for washing out the mixers; and a standpipe connection from the tank has been installed so that water will be available for fire protection in the ready-mix plant and in the adjoining crushed stone and paving plants, regardless of cold weather temperatures.

Eastern Block Concern Buys Autoclaves of New Design

Massachusetts Cement Block Company of Medford, Mass., recently ordered two autoclaves of a new design from Shore Engineering, New York, N. Y.

Each of the units will be 100 ft. in length and will have a 10-ft. internal diameter. An unusual feature will be the lengthwise loading in two rows. Capacity of each autoclave will be about 2,808 blocks. Rails have been eliminated in the design to avoid the need for the block concern to purchase new fork lift-trucks to replace their platform trucks.

Offer Booklet on Masonry Building Code Specifications

Requirements for masonry construction of all types (American Standard A41.1) have just been reviewed and revised. The American Standard covers specifications suitable for use in building codes, and includes definitions, specifications for materials, allowable stresses, and such miscellaneous requirements as those for the thickness of foundation walls, bonding of masonry walls, spacing, chases and recesses, protection against freezing, and bracing against lateral loads.

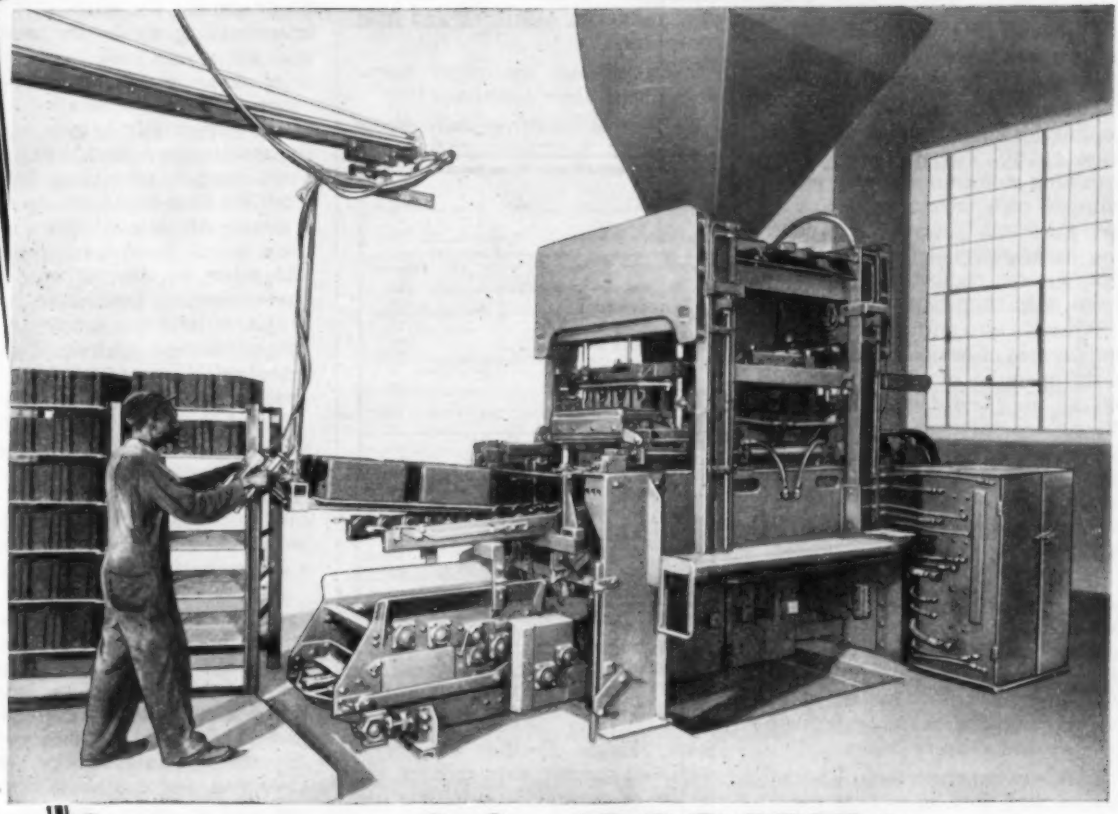
American Standard Building Code Requirements for Masonry, A41.1 may be obtained from the American Standards Association, 70 East 45 Street, New York 17, at 20c per copy.

Federal Cement Tile Company Buys St. Louis Precast Plant

Federal Cement Tile Company, Chicago, Ill., which manufactures concrete roof and floor slabs, has purchased the business and organization of the Precast Slab and Tile Company of St. Louis, Mo.

The St. Louis plant will remain in operation. John Brouk, president of Precast, who has been elected a vice-president in the parent firm, will maintain his headquarters in St. Louis.

The "King" RULES



"because it's RIGHT!

Yes, the GOCORP "King" is tops in each area in which it operates. That's because the blocks it makes are so superior, and are produced at a cost less than ordinary blocks. Here's a machine that represents the best and latest thinking of men with a lifetime of experience in this field. Block plant owners who have investigated, like the owner of this typical "King" operation, recognize these advantages GOCORP offers:

- Hydraulic "sequence operation"— for high quality blocks, low maintenance.
- Vibrating mold filled directly from main supply hopper—no feed drawer.
- Intense vertical vibration, combined with pallet-to-mold clamping, assures compact, uniform units.
- "Tomorrow's machine today" — removes obsolescence risk.

These are only a few reasons why the GOCORP "King" rules. If you want three or four cycles per minute—six blocks per cycle—with one operator—simultaneous production of two sizes, if desired—write for further details on the "King" and name of our representative near you.

GO CORP
ADRIAN-MICH.
454 Grace Street Adrian, Michigan

Cost Accounting in Ready-Mixed Concrete*

By ED PITZER
Hilltop Building Materials, Inc.
Cincinnati, Ohio

IT is important to note the tremendous growth and progress of the ready-mixed concrete business since it originated. We in Ohio are particularly proud to be one of the top producing states in the country, and we take pride in the standards set by our own concrete association.

Today it is evident that we are heading for another standard, which is cost control. Perhaps this tendency is gaining momentum among us because of such factors as unsatisfactory price relief, increasing production costs, potential leveling off period, greater competition, and the desire to serve our customers better.

What is cost control? It is an orderly system of compiling all expense in the operation of a business so that we can use these data to determine the cost of making, delivering, and promoting the product. The most important or primary function is to enable us to determine whether our costs are as low as we can efficiently get them.

Since the discussion of all costs in ready-mix would involve entirely too much time, and since I certainly am not qualified to discuss the producing or promotion of concrete, I will limit my efforts to one of the larger costs, and that one is maintenance and delivery costs.

In discussing these costs, I am going to place them in two categories: first, practical suggestions for cost records; and second, emphasis on fleet maintenance costs and how you can use them to advantage. I will combine these two categories so as to show you better how the system works for us.

It is important to point out at this time that I am not attempting to tell you how to operate your cost records. I am merely going to pass along methods that we at Hilltop in Cincinnati, Hamilton, and Dayton have been using and plan to use later. These methods can be applied to a small operation and expanded as your needs occur.

In the way of background, we are operating approximately 100 pieces of equipment, the majority of these being Mack tandem trucks and 3-, 4½-, and 5-yard cu. yd. Smith Mixers. Our mechanical department does 95 percent of all repairs, and we have lube men to service our units. We operate in hilly country; ground conditions are mostly clay; and we serve residence, industrial, and road contractors.

Following are the paper forms we use and their functions:

1) We have a driver daily report

DRIVERS' DAILY SAFETY CHECK

Vehicle No. _____ Date _____ 19____

Speedometer Reading _____

√ If OK		√ If NOT OK
☐	..Foot Brakes	☐
☐	..Hand Brake	☐
☐	..Tires	☐
☐	..Truck Radiator	☐
☐	..Mixer Radiator	☐
☐	..Truck Oil	☐
☐	..Mixer Oil	☐
☐	..Truck Gas	☐
☐	..Mixer Gas	☐
☐	..Flaps	☐
☐	..Water in Mixer Drum	☐
☐	..Instruments	☐
☐		☐
☐		☐
☐		☐

I have physically tested, where possible, or inspected the items listed above and found conditions as checked. I have written a report on the reverse side regarding those checked NOT OK.

Signed _____ Driver

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Form 3111. PLANT FORMS, Columbus 16, Ohio

Fig. 1. Driver daily report form.

form (Figure 1) that supplies us with unit number, date, mileage, and a list of several vital checks the driver must make each morning on his unit. The form offers a roadworthy check to both the driver and the mechanical department. In making this check, the driver occasionally will discover a minor repair that may cost 15 minutes' labor (approximately $1.00) and avoid a major breakdown later, which, we find, costs an average of $89.12. As you well know, this down time is costly in many direct and indirect ways.

2) The time card (not shown) furnishes both the time and yardage involved on each trip.[1]

3) We use a shop repair form (not shown) consisting of two copies, one of which goes to the fleet maintenance office, the other to the maintenance shop foreman. (This is the usual repair order form for any automotive work.) This form is filled out by the dispatcher from information given by the driver. It may list a road call, major repair, or a minor repair. When the unit comes in for major repairs, it gives us the opportunity to give it a routine maintenance check, which eliminates another scheduling into the shop. We have found that by having a routine schedule to tighten up and check a unit it takes but little time and saves the expense of a costly time-consuming breakdown later.

4) Our lube men record all gasoline, oil changes, and oil added to a gas sheet (Figure 2) daily. This form doesn't need explanation.

5) A battery check form[2] (not shown) is also used by the lube men to check batteries periodically. This check has eliminated many road calls, which always prove to be expensive, and has served to maintain a better balanced electrical system.

(6) We have tire change cards (not shown) to record tires coming off the unit, those going on, mileage, nature of repair, and tires being sent out for service. All of our tires are branded so that we can identify them easier and follow the history of that tire through original cost, repairs, recapping, and eventually determine our cost per mile. This also serves the purpose of making everyone more tire-conscious, and assists us in our tire selection and buying. We found that tires can be a much larger cost item if not properly handled. In 1952 alone we saved nearly $3,500 on tires by watching inflation, repairing before more extensive injury occurred, and, through the help of our drivers, carefully watching and checking them frequently. We have also been able to determine that certain types and designs of tires do a much better job than others. This is important because a tire with too much traction will increase axle and differential costs, while one with not enough will create dissatisfied customers, disgruntled drivers, and increase tire wear by 25 percent.

7) In our shops we have a parts charge-in (Figure 3) and charge-out form (Figure 4). This is to record any parts received and also those used on the units being repaired.

*Presented at the annual meeting of the Ohio Ready-Mixed Concrete Association, June 16, 1954, Hotel Cleveland, Cleveland, Ohio.

[1] Several forms accompanying the article, are not shown here, due to lack of space required to reproduce the details these forms contain. The preventive maintenance routine check referred to includes the following items: (A) Check with driver for defects; (B) Steam clean; (C) Engine (25 items); (D) Chassis (21 items); (E) Cab (8 items); (F) Mixer: check transmission, clutch, drive shafts, joints, frames, supports, cowling, drum, head, gears, rollers, tail gate assembly, tank, and water pump; (G) Dump body trucks: check hoist, tail gate linkage, pins, body condition; (H) Road test; (I) General remarks, unusual conditions, etc.

[2] The fleet battery record, the tire mileage record, and the vehicle tire record cards are supplied by the manufacturers of these items.

We stock an ample supply of parts and control this with a perpetual inventory card system (Figure 5). This system supplies the location of parts and aids in controlling our inventory through buying. These parts are set up in groups such as: O1 Engine, O2 Clutch, O3 Fuel, O4 Exhaust, etc. We also use the same grouping in recording the explanation of repairs to the unit cost records.

The above forms are sent to our fleet maintenance office and recorded on permanent unit record cards. We have a consolidated gasoline consumption, oil consumption, and cubic-yards-hauled form on which we enter the gas sheets and time cards daily. At the end of the month, these items are entered in total to an annual truck and mixer record card (Figure 6). From this form we watch oil consumption and check our gasoline consumption per cu. yd.

The parts charge-out forms and the driver daily safety check forms provide us with parts cost, unit history, and mileage, These are also entered on the annual truck and mixer cost record. All the costs that I have mentioned are now entered on the annual truck and mixer cost and history record. From these records, we total them into the following grouped expenses: truck and mixer parts used; outside labor and parts; mechanical labor; shop supplies; tires, tubes and repairs; grease and oil consumption; gasoline consumption; drivers' wages, depreciation.

We total these costs and divide the number of cubic yards by that figure to arrive at an average cost per cubic yard. For instance, if our delivery costs were $120,000 and we hauled 50,000 cubic yards of concrete, our average cost would be $2.40 per cubic yard. Is this too high? If we break it down into a cost per cubic yard per truck mixer unit, we will start to get an answer. We may find that one unit will deliver concrete for $2.95 per cubic yard, while another unit will do the same job for a cost of only $2.05. This gives us a definite idea that one unit isn't doing a very good job. We generally find that one or possibly two large justified expenses are the reason; or, in other cases, it may be a series of constant breakdown expenses. In the latter case, we prove that the unit isn't the right type of equipment for the job. One important expenditure in one year can mean a much more profitable operation in the future.

If, on the other hand, we find most unit-cost-per-yard figures in line, the problem then can be approached by analyzing the various total costs. We found the parts and labor cost to be too high one year. We decided that by purchasing more rugged equipment that would haul larger loads legally and absorb more punishment, we could reduce frequent and costly breakdowns. We realized that although the initial cost was higher, which in turn would increase the depreciation amount, the reduction in parts usage cost and driver and mechanic wages will generally offset this initial cost by as much as 15 percent. We concluded from this that the larger equipment was best suited to our particular operation. We also found that although we are using much larger engines, the gasoline consumption per cubic yard is about the same as for the smaller engines.

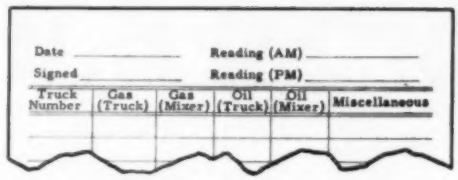
We attribute our vast reduction in road calls and major breakdowns to two things: (1) our larger and better equipment; and (2) our improved program of preventive maintenance. We note particularly that the periodic tightening program has saved many costly expenditures, and we hope to improve this even more in the future.

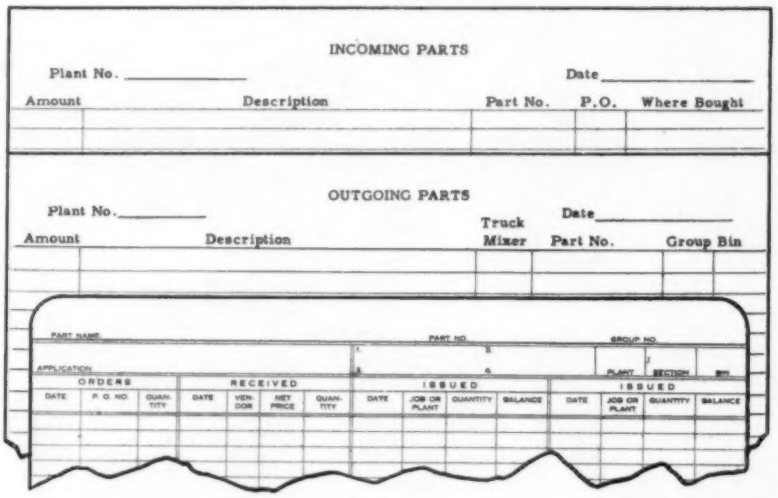
Two of our more recent programs for driver training and safety have helped immensely in further reducing our costs. We are assured that these programs tie in very well with our cost program to lower that cost per cubic yard.

By way of summing up, I would like to say that cost control has helped us greatly in reducing some of our costs by showing us what equipment should be retired from the fleet; it has enabled us to better select our present and future equipment, taught us to standardize whenever and wherever practical, gave us a more accurate cost per cubic yard, and solved some of those constant problems that we all have. We still have problems and hope to find answers for them.

In conclusion, I hope that in compiling and analyzing your costs you are adhering to some set system that you can get a more accurate picture of your operation. Watching cost control saves you money in the future.

Right—Fig. 2. Gas sheet.
Below—Fig. 3. Incoming parts.
Fig. 4. Outgoing parts.
Fig. 5. Perpetual inventory card system.





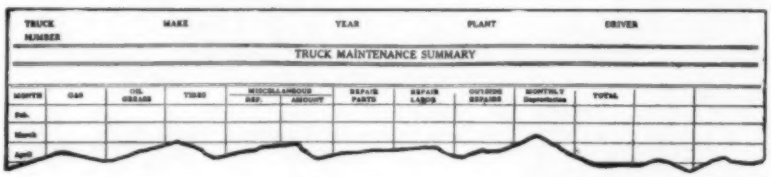
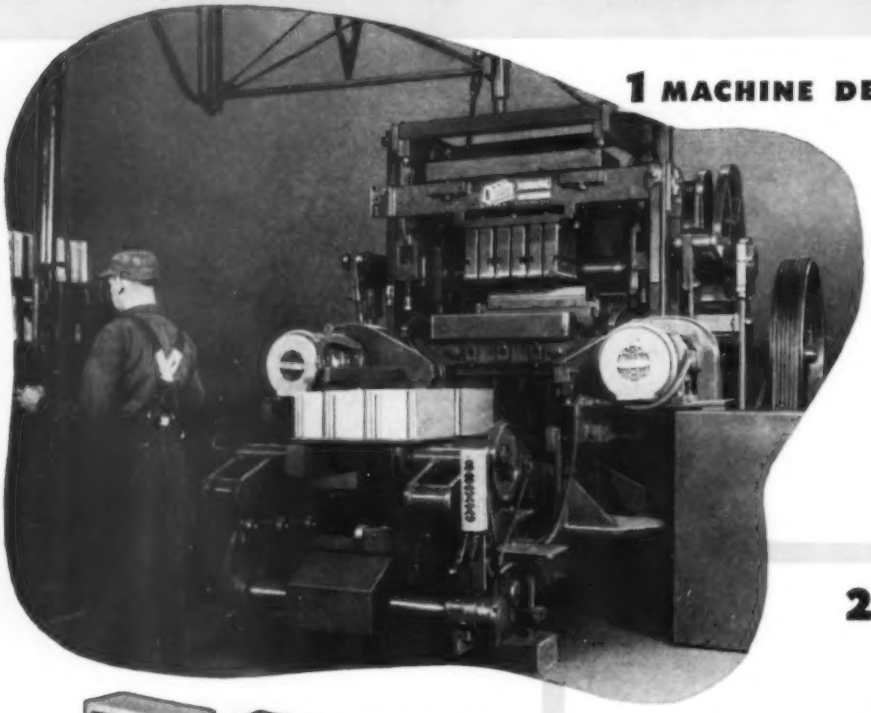


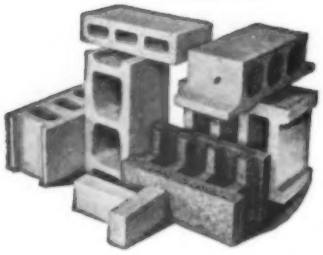
Fig. 6. Annual truck and mixer record card.

BESSER 9-Point Service . .



1 MACHINE DESIGN and DEVELOPMENT

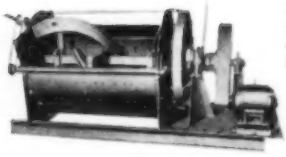
Besser made the first concrete block machine over 50 years ago. Since then, Besser's major service to the Concrete Block Production and Building Industries has been a continuing program of improvement in concrete block and block-making equipment. Additional constructive Besser services, rising from this "foundation service" of Machine Design and Development, are helping VIBRAPAC Concrete Block Plants to produce more and better block at substantial profit.*

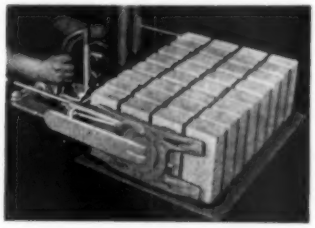


*Today, many Concrete Block Plants are making up to 120,000 block per day with multiple VIBRAPAC Block Machine installations . . . using one set of Plain Pallets for block of all sizes and types.

2 COMPLETE LINE of ATTACHMENTS and ACCESSORIES

Besser VIBRAPAC Machines are always "star performers" in concrete block plants, but Besser also provides a complete "cast" of supporting equipment . . . Besser Batch Mixers (50 cu. ft. model shown here), Lift Trucks, Hoists, Racks and other specialized units.





The Besser Brick Clamp is another vital accessory, for fast, safe handling of concrete brick . . . as shown at right, clamping 32 brick made on a Plain Pallet.

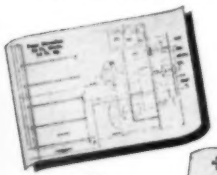
BESSER is the world's leading manufacturer of concrete block machinery and equipment

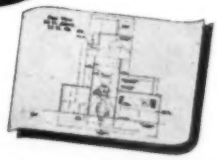
Leadership in pioneering new concrete block machines and production methods has just naturally won for the Besser company the No. 1 position in this industry. VIBRAPAC Block Machines with daily capacity of 7500 units per day are evidence of progress in production . . . and recognition of the advantages of concrete block permanence, fire-safety, insulating and sound-proofing qualities, economy and beauty is shown by the fact that

Over TWO BILLION Concrete Block were produced in 1953

3 BLOCK PLANT ENGINEERING SERVICE

Besser provides professional guidance based on broad, practical experience in all phases of planning, constructing and equipping concrete block plants for various production capacities, including material handling and processing methods and equipment, storage and sales display facilities . . . for new plants or expansion of present plants.





A few of the many practical plant plans available to block producers.

BESSER
50th Anniversary
1904-1954

...a Half Century of Concrete Masonry Progress!

. BUILDS PROFITS for YOU

4 "MATERIALS-and-METHODS" SERVICE

Working closely in cooperation with Portland Cement Assn., National Concrete Masonry Assn., American Society for Testing Materials and other organizations, Besser offers to block producers the cumulative results of Materials and Methods research and testing. Sieve Analyses are provided . . . plus aid to assure clean aggregate; right grading and proportioning; proper cement proportioning; right mixing time; correctly compacted concrete; steam curing for strength and uniformity of block; covered storage for drying; quality controls throughout production.

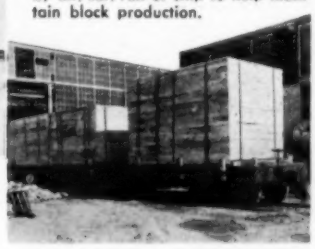
7 CO-OPERATIVE SALES PROMOTION

Many sound advertising-merchandising aids to sales are provided, including National Advertising; Newspaper Ad Mats; Home Builders Booklets; Plan Books with 180 modern home plans; Exhibit Units; Movie Films; Radio Scripts; Special Bulletins; Match Books; Post Cards and other valuable aids.

5 WORLD-WIDE SERVICING FACILITIES

Besser Service knows no geographical limits. Any call for service from any part of the world where Besser VIBRAPAC Machines are operating, gets prompt action. Stocks of parts are carried at strategic points. Qualified servicemen are ready to travel by air, car, rail or ship to help maintain block production.

Loading urgently needed parts into plane for faraway destination.



8 SCHOOL FOR BLOCK MAKERS and USERS

An actual working course for block producers is part of Besser 9-Point Service . . . to provide instruction for worker-students by actually making various types of block to highest quality standards. Competent Besser instructors cover all phases of production, sales and advertising . . . to guide plant operators to success.

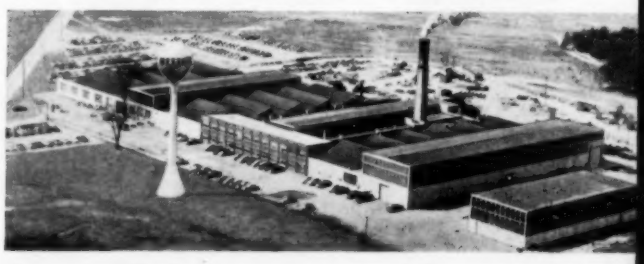
Breaking ground for Besser School near main plant in Alpena.

6 SERVICE TO ARCHITECTS and BUILDERS

Outstanding examples of Besser service to architects and builders include the development of Modular Sizes in many standard and new types of units (such as Soffit Block for floors, ceilings, roofs); permanent architectural exhibits; design and construction consulting services . . . all extending the construction range and structural versatility of concrete block.

9 SUPERIOR PRODUCTION FACILITIES

All these constructive Besser Services are predicated on Besser's unequalled facilities for maintaining highest quality standards. This big, modern plant is equipped with the finest precision machine tools. Expert mechanics, backed by half a century of engineering and production know-how, assure dependable VIBRAPAC machines and service.



BESSER COMPANY • Alpena, Michigan, U.S.A. J 3598

ASTM Committee C-13 Sets New Specifications For Low Pressure Pipe

The concrete pipe committee (C-13) of the American Society for Testing Materials met for three days in Chicago on September 9, 10 and 11. Two new specifications were brought out of a subcommittee for publication as tentative standards. One is for low internal pressure sewer pipe; the other is for low internal pressure irrigation or water pipe. The first is designed for operating heads up to 50 feet, whereas the other is for heads up to 100 feet. Although the specifications were approved for publication, it will be several months before they are available. They must first be approved by letter ballots of the committee and then by ASTM headquarters.

Sixteen producer members of the committee were in attendance. The general interest and consumer members were represented by nine men or their proxies.

Tentative revisions to Standard Specifications C14 for Non-reinforced Concrete Sewer Pipe, C75 for Reinforced Concrete Sewer Pipe, C76 for Reinforced Concrete Culvert Pipe and C118 for Concrete Irrigation Pipe were approved for publication as Standard. That is to say, several revisions which have appeared at the end of the specifications for study and criticism will now appear as part of the body of the specifications when they are printed next year as C-14-55, C75-55, C76-55 and C118-55.

Some of the changes follow:

C14:—extra strength C14 pipe, similar to extra strength clay pipe in strength test requirements, will be included along with the present standard strength pipe. It will have heavier walls. Tongue and groove pipe will be allowed along with the present bell-and-spigot pipe in both standard and extra strength classes provided the shell is 1¾ in. thick or more. C75 and C76:—Lift holes will be allowed for handling in the field. Cores or cylinders may be used to determine the strength of concrete in pipe over 72 inches in diameter. For smaller sizes, cores cut from the pipe wall or cylinders made in a similar way to the pipe may be used with mutual consent of the buyer and seller instead of using full size pipe for the test.

Where two rings of circular steel are used, a manufacturer may put anywhere from 50 to 60 percent of the total steel area in the inner cage and the remainder in the outer cage.

C118:—Concrete irrigation pipe may be used for drainage when laid with open joints.

In addition to the changes mentioned above, all four of the specifications include a cooling period of 16 hours or more and the use of clean tap water in the absorption test. The three-edge bearing test has been modified to permit the use of hard rubber strips or sand-filled high-pressure hose or the wooden bearings previously specified.

Newest business enterprise in Stanberry, Mo., is the ready-mix plant added recently by Allison Concrete Products, owned and operated by Herb Allison.

Roderick B. Young Dies— Prominent Authority On Concrete Industry

Roderick B. Young, famed as an expert on concrete, died on August 24 in Toronto, Ont. He had been associated with the Ontario Hydro-Electric Commission for 41 years.

Mr. Young was Hydro's associate director of research until recently. In 1928 he won the Thomas Fitch Rowland prize of the American Society of Civil Engineers for his work in concrete techniques.

In 1937 he received the Wason Medal of the American Concrete Institute and in 1953 the Award of Merit of the American Society for Testing Materials. Mr. Young was made an honorary member of A.C.I. in 1953. He was a member of the Association of Professional Engineers of Ontario and the Engineering Institute of Canada.

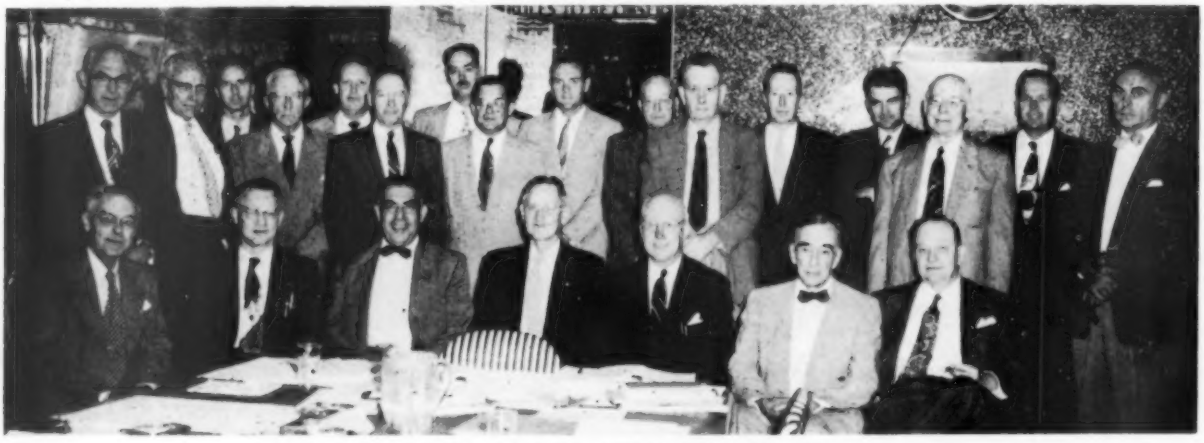
The Minnesota Concrete Products Association will hold its annual meeting and show Dec. 6-7, 1954, at the Hotel Leamington in Minneapolis, according to W. J. Brull, president.

Truck Holding Time

(*From page* 204)

for compensation for excess waiting time and that therefore they make no effort to enforce a standard. A majority . . . however, believe that the problem, however difficult, must be handled and that failure to include a provision for a charge for excess waiting time is a mistake which will cost the producer dearly." This is undoubtedly the logical policy, even though it creates a perpetual headache.

Group of men attending the ASTM Committee C-13 meeting in Chicago recently were: standing, left to right: Howard G. Curtis, U. S. Bureau of Reclamation; R. W. Gilmore, Baltimore and Ohio RR.; J. B. Verhoek, Greeley & Hansen; W. Lyle McDaniel, Massey Concrete Products Co.; John G. Parlett, United Concrete Pipe Corp.; Merril Butler, Los Angeles Deputy City Engineer of Design; Frank B. Brown, Wire Reinforcement Institute; H. W. Heath, Lock Joint Pipe Co.; H. W. Easterly, Jr., Concrete Pipe & Prod. Co., Inc.; C. M. Howard, Concrete Products Assoc. of Washington; M. W. Loving, Consulting Engineer; Benj. B. Bullwinkle, Tuerck MacKenzie Co.; John H. Bailey, The Cretex Companies; W. E. Corbett, Corbett Concrete Pipe Co.; Peter VanKuran, American Pipe and Construction Co., and Col. L. C. Gilbert, Assistant Technical Secretary, A.S.T.M. Seated, left to right: Frederick C. Zeigler, Seeyle, Stevenson, Value & Knecht; Prof. M. G. Spangler, Iowa State College; E. F. Bespalow, Choctaw, Inc.; Col. R. R. Litehiser (Chairman), Engr. of Tests, Ohio Highway Dept.; E. F. Kelley, Physical Research Branch, Bureau of Public Roads; Howard F. Peckworth, American Concrete Pipe Ass'n.; J. A. Dunn, Hume Pipe of New England, Inc.



Should be in every BASEMENT!

● Basements as well as utility rooms in basementless houses should be protected against water damage. That means using Medusa Waterproofed Cements (or Waterproofing Paste or Powder when waterproofed cements are not available) in all concrete and mortar. These Waterproofings bring economy for the builder, satisfaction for home owners and extra profits for you.

The cost of using Medusa Waterproofings over a non-waterproofed cement is so small that it means practically nothing in the total home cost, yet assures home owners of dry basements and utility rooms for years to come.

Medusa Waterproofings are available everywhere in one of these forms—Medusa Waterproofed Gray and White Portland Cements, or Medusa Waterproofing Paste and Powder for mixing with regular portland cements. Contact your nearest Medusa sales office for further details.

MEDUSA Portland Cement Company

1000 Midland Building • Cleveland 15, Ohio

SALES OFFICES
Chicago, Illinois
Pittsburgh, Pa.
Milwaukee, Wisc.
Cleveland, Ohio
Toledo, Ohio
New York, N. Y.
York, Pennsylvania

WHITE • WATERPROOFED WHITE • GRAY
WATERPROOFED GRAY • AIR ENTRAINING • HIGH EARLY STRENGTH • STONESET • BRIKSET
WHITE TILE GROUT CEMENT

MAKERS OF AMERICA'S FINEST PORTLAND CEMENTS FOR OVER SIXTY YEARS

Marietta Concrete Corp. Builds Precast Swim Pool

THE first precast concrete swimming pool ever built was put into service early last summer at the estate of Richard Harte of Williamstown, W. Va. The 20- by 40-ft. pool, built at a total cost of $4,500 (including filtration equipment, diving boards, and walkways), represents the latest production endeavor of The Marietta Concrete Corporation, Marietta, Ohio, one of the country's leading producers of aggregates, specialized concrete products and ready-mixed concrete.

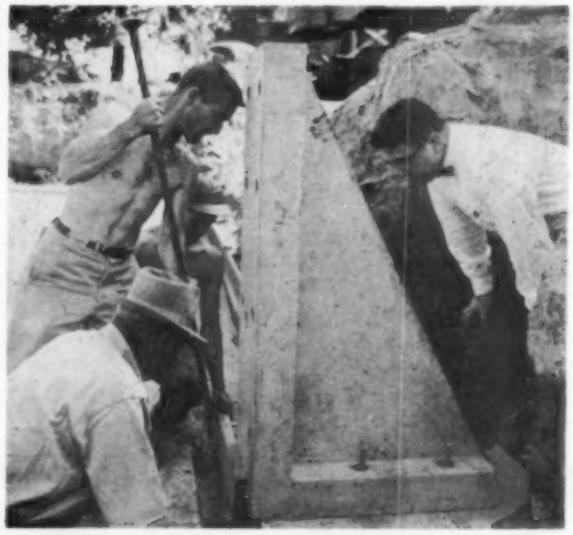
The pool floor was first cast in place at the site, recesses being formed around the edges of the floor to hold securely the precast side and end wall sections. These prefabricated wall sections, six in number, were put in place in nine hours. Included in this time was the placing of the two L-type concrete brackets, bolted into their positions at the centers of the long sides of the rectangular pool. From this skeleton the remainder of the pool took form.

Each end wall of the pool was precast in a solid section 5 ft. high, 20 ft. long, and 5 in. thick. Integral steel bar reinforcing was installed prior to the casting of the concrete at the plant. Each of these two end walls weighed 7,000 lb. The four similarly reinforced side wall sections (two to a side), were approximately the same in length and thickness but were cast in the form of a trapezoid to make the center of the pool deeper. (See illustration.) All these sections were transported to the site by truck and set in position with a mobile crane.

Tongue-and-groove type joints were used along all edges of sections in contact, rubber hose material being employed to insulate and insure watertightness. Bolts were passed through metal eyelets set in the concrete to draw the sections together tightly in assembly. Three hours were spent in erecting and bolting the six panels and two brackets in place, and six hours for lining up the sections and grouting and caulking the joints.

Economical construction and flexibility of size are two features of prefabricated pools which may point the way toward a new era in small swimming pools for residential use. This type of construction may also enable many of the smaller municipalities with limited funds to provide community pools.

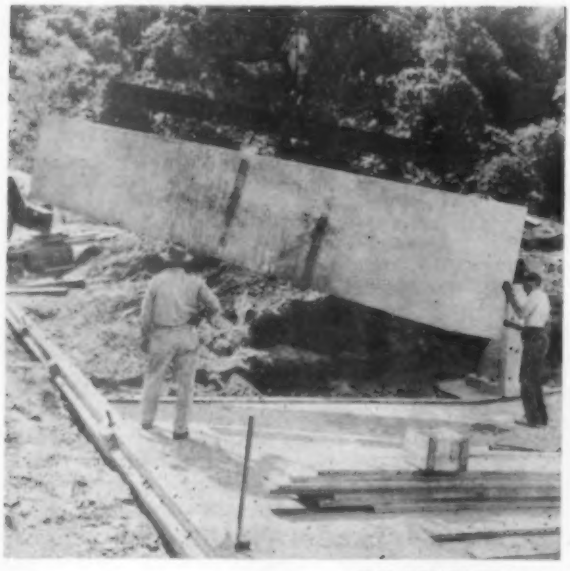
The plans for the pool were conceived by J. Robineau, president of the American Pool Company, Briarcliff, N.Y.; structural details were developed by Professor George E. Large of Ohio State University. R. Neil Christy, vice-president in charge of engineering, and Richard Adams, architectural engineer, of the Marietta company, assisted in the planning and design of the project.



Right: One of the two L-type concrete side bracing brackets, used to maintain the side wall sections in the precast concrete swimming pool.

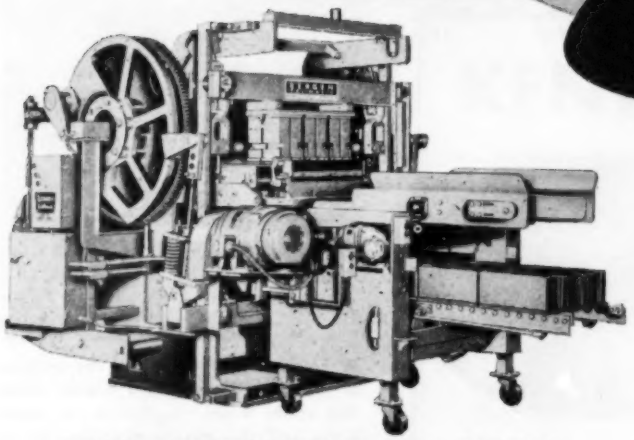
Below, right: View of the precast concrete swimming pool during construction, and before backfilling was completed. Note the recessed section at the top of the wall, for the possible tie-in of a sidewalk later.

Below: View of an end wall section being moved into position by a crane. This precast wall, 5 by 20 ft. in area and 5 in. thick, weighs 7,000 lb.



MODERN EQUIPMENT FOR MODERN PRODUCTION

GET IT AT BERGEN



HIGH-PRODUCTION TRI-MATIC
(1000-8" BLOCK PER HOUR)

AVAILABLE 3 WAYS

1. CASH PURCHASE
2. TIME PAYMENTS
3. LEASE WITH OPTION TO BUY

More and more block plant owners are realizing the importance of good, modern, dependable equipment. Many of these owners also realize the importance of the manufacturer from whom they buy their equipment.

When dealing with Bergen, block plant men have found the Bergen organization to be reliable and dependable — an organization with over 30 years experience and "know-how" in the block business — an organization that stands behind every product it sells or service it renders.

WOULD YOU LIKE A BERGEN SALESMAN TO SHOW YOU THE COMPLETE BERGEN LINE OF BLOCK PLANT EQUIPMENT AND TALK OVER YOUR PROBLEMS? YOU'LL FIND HIM HELPFUL AND THERE'S NO OBLIGATION ON YOUR PART.

HEADQUARTERS FOR BLOCK PLANT EQUIPMENT

50 Cu. Ft. MIXER • SKIP-HOIST • FRONT PALLET RETURN • HEIGHT AND DENSITY CONTROL • PALLET CLEANER • REPLACEMENT PARTS • YARD-BIRD SWEEPER • FORNEY TESTERS • BLOCK SPLITTER • LIGHT WEIGHT OFF-BEARER • TIME RECORDER • SPECIALIZED TOOLS

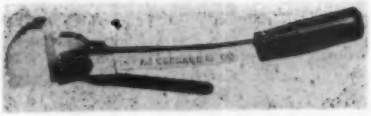
Let Bergen estimate on your next replacement part, repair or new equipment. Simply call Bergen "Collect" or write to:

BERGEN MACHINE & TOOL CO., INC. NUTLEY, N. J.
You are invited to call us "COLLECT". NUTLEY 2-7300

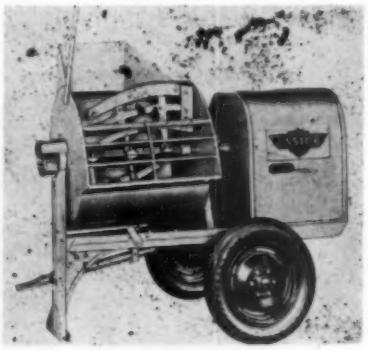
IN CANADA
Construction Equipment Co., Ltd.
Toronto
Halifax, Montreal, London, Edmonton

CM New Machinery and Supplies

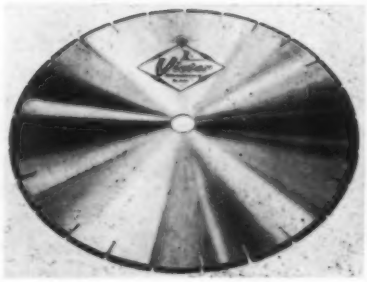
● This Ross straddle carrier has a 20,000 lb. maximum capacity, is fully hydraulic, and features excellent drive and maintenance visibility. A concealed spring arrangement in the corner posts protects wearing surfaces from weather and dust. (101)



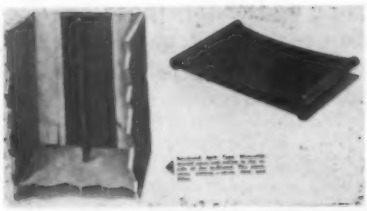
● Designed for strapping concrete forms, this new tensioning tool is being made by A. J. Gerrard & Co. to handle all standard gauge form strapping. It operates easily from any position to tie floor, wall or bridge forms. The strap is nailed to one side of the form, drawn tight by the Formbinder and nailed to the form; the Formbinder is then removed. (102)



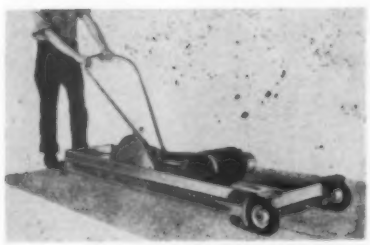
● Essick recently celebrated the occasion of the 50,000th sale of its popular mixer. One of the larger manufacturers of mixers in the land, they have been serving the industry many years. (103)



● Bonding these Victor diamond blades in tungston carbide gives them a very long cutting life. The blade is especially recommended for highly abrasive materials, such as concrete block, firebrick, sandstone, granite, etc. They are available for all masonry and road saws. (104)



● A split-type dumbbell rubber waterstop made by Servicised Products Corp. eliminates the need for slotting or split-bulkheading when forming structures under hydrostatic pressure. (105)



● Construction Machinery Sales Co. has announced a new masonry saw which provides simple modifications for long cuts, and easy-to-make conversion to a slab cutter. (106)

NOVEMBER 1954

MORE INFORMATION PLEASE

THE CONCRETE MANUFACTURER
431 S. DEARBORN ST.
CHICAGO 5, ILLINOIS

Please send more information on items described in editorial columns of this issue, as circled below.

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144						

Name_____ Title_____

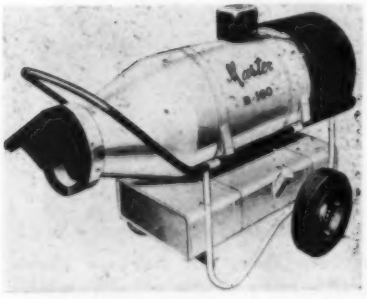
Company_____

Address_____

City_____ Zone_____ State_____

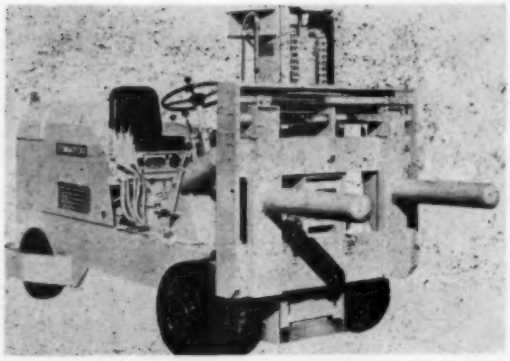
● The American Road Equipment Co. announces this general purpose high lift (18 ft.) loader specifically designed for heavy duty use in handling building materials. Featuring heavy-duty industrial 4-in. hydraulic cylinders, it mounts on practically all types of tractors. **(108)**

● You just squeeze for your keys when you have this Jet key case. This original, squeeze-open, drop-out case brings new convenience as well as one-handed simplicity to key carrying. Makes an ideal promotional give-away at only $1.00, or $1.50 with 3 gold initials. **(109)**



● Taking up less than 10 sq. ft. of floor area, this Master space heater delivers 160,000 B.t.u. of forced air heat per hour. Easy to operate, the furnace rises to full heat in 2 minutes, is readily portable, and burns 12 hours without refueling. **(110)**

● Handling double loads of unwieldy open-center material can be accomplished with speed and ease on this Towmotor hydraulically actuated Twin Ram attachment, one of the concern's new standard accessories. **(107)**



KENT LINTELATORS

Now Available in Sizes

UP TO 12′

Kent Lintelators have been outstandingly successful from the start.

They produce strong lintels with block texture and have been accepted by builders wherever introduced.

They afford the fastest, least costly method of producing quality lintels.

And with their constantly growing acceptance has come demands for machines to produce larger and larger lintels.

The latest Lintelator now available produces lintels up to 12 feet long and embodies all the advantages of the smaller machines.

An important item is the fact the the large machine can also produce a range of shorter lintels efficiently since the end members of the mold are adjustable.

Get the Lintelator story today.

The KENT MACHINE COMPANY

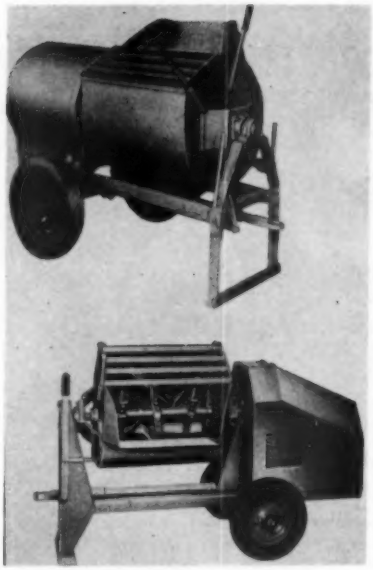
CUYAHOGA FALLS, OHIO

CONCRETE PRODUCTS MACHINERY SINCE 1925

Canadian Distributor: Wettlaufer Equipment, Ltd., 49 Merton St., Toronto 12, Ontario

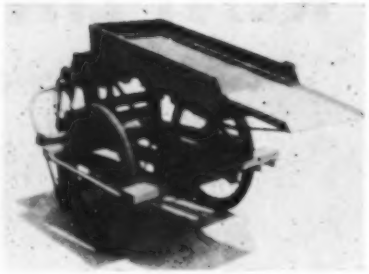
● This heavy-duty, pneumatic-tired fork truck, the Clark-Ross Y-200, a 20,000 lb. at 24-in. load center machine is now available. The controls are all hydraulic, including lift, tilt, power steering, and power braking. It was built from the ground up for rugged use.

(111)



● Two new plaster and mortar mixers are announced by the Knickerbocker Co. Both models feature increased capacity over previous models, and are available powered by gasoline or electricity.

(113)



● Mounted on wheels, this Kent portable screen speeds screening of sand and other aggregates and often makes available material which otherwise might have been wasted. It is available powered by either gasoline or electricity, and is very reasonably priced.

(112)

ROOF SLABS

PreCaster brings you new profits

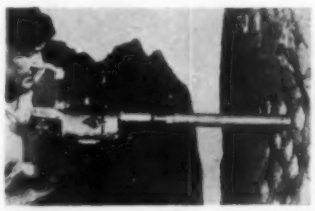
- Looks like the old has-been materials are heading for the last "round-up."
- Why? Competition mostly. The trend today is toward economy in building materials. That's the way it goes. Competition means progress for some things, Obsolescence for others.
- Naturally, you want your product to be a success in these competitive days ahead. So, you're probably looking right now for new ways to improve quality and cut production costs. That's where we here at PreCaster may be able to help.
- Competition is wonderful when you're ahead of it. Our business is to keep you there.
- Write today for data sheet and price list.

PreCaster Inc. • 5217 Beech Street • Cincinnati 17, Ohio

Also available through Jack Ellis., 119 Ann Street, Hartford, Conn. . . . Cline-Thornton, Inc., Glenwood Ave. at 17th & Lehigh Ave., Philadelphia 32 . . . E. M. Wakeman and Associates, 905 Easton Drive, Lakeland, Fla.

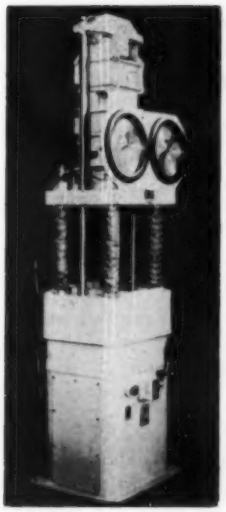
● Fewer men are needed for chute operation when a Monarch automatic hydraulic Dyna-Chute kit has been installed on your mixer. All the controls are mounted at one box and the driver can easily and quickly adjust the chute.

(114)

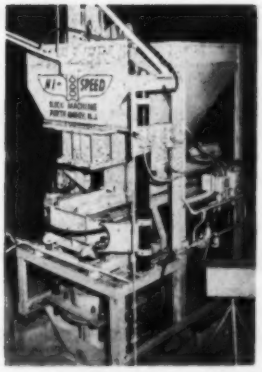


● Demo claims that their new electric portable rotary hammer with a detachable bit for horizontal and overhead drilling of reinforced concrete, masonry, etc., drills faster and more economically than any other of comparable size and weight.

(115)

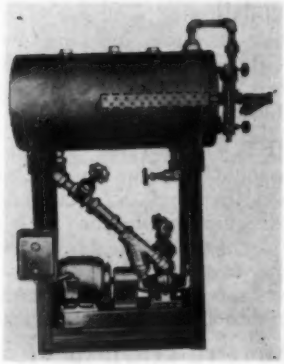


● Believed the first concrete tester made especially for testing 8- x 18-in. blocks in tension as well as compression, this Forney accessory group #5 attaches to the standard LT-500 tester in less than an hour and is built in accordance with ACI standards. **(117)**



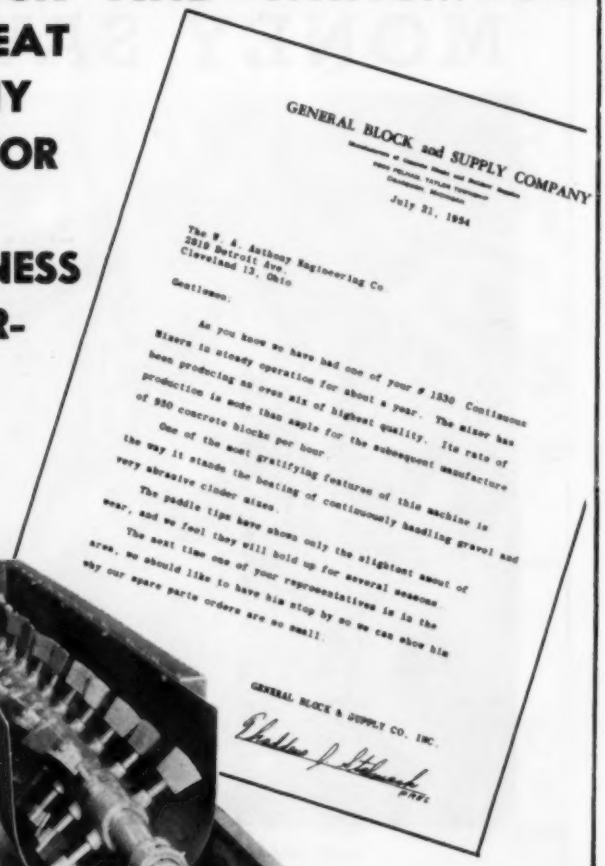
● Yellen's new "CCP" Hi-Speed plain pallett block machine uses only a 1 hp. electric motor to vibrate the moldbox and a 10 hp. air compressor to operate at its full rated capacity of 480 8-in. blocks per hour. **(116)**

● Designed especially for mechanized material handling on off-pavement surfaces, this Sherman fork lift attachment for Ford tractors is operated hydraulically and lifts a load of up to 4000 lb. **(118)**



● A new boiler feed system, incorporating a pre-heater that operates on steam from the boiler has been added to Cyclotherms line of boiler feed systems. Tank sizes range from 30 to 540 gal., and they will supply from 280 to 2800 gal. of pre-heated water per hour. **(119)**

HERE'S THE EVIDENCE... IN BLACK AND WHITE...YOU CAN'T BEAT ANTHONY MIXERS FOR POWER, RUGGEDNESS AND DURABILITY



GENERAL BLOCK and SUPPLY COMPANY

July 21, 1954

The W. A. Anthony Engineering Co.
2819 Detroit Ave.
Cleveland 13, Ohio

Gentlemen:

As you know we have had one of your # 1830 Continuous Mixers in steady operation for about a year. The mixer has been producing an even mix of highest quality. Its rate of production is more than ample for the subsequent manufacture of 950 concrete blocks per hour.

One of the most gratifying features of this machine is the way it stands the beating of continuously handling gravel and very abrasive cinder mixes.

The paddle tips have shown only the slightest amount of wear, and we feel they will hold up for several seasons.

The next time one of your representatives is in the area, we should like to have him stop by so we can show him why our spare parts orders are so small.

GENERAL BLOCK & SUPPLY CO. INC.

Our engineers will be glad to give you installation estimates at no obligation.

THE COLONIAL IRON WORKS CO.
17643 St. Clair Ave. Cleveland, Ohio

New Literature

STRONG BINS. "Bins with the Strength of Pillars" is the title of this *Neff & Fry* booklet describing silo-type bins for concrete and aggregate plants. (120)

TRUCK MIXER. Less weight for bigger payloads, standard industrial engine with a positive chain drive and a specially designed drum with blades which last longer are the features claimed in this booklet on the *Rocket* mixer truck. (121)

RUGGED CRANE. Complete specifications and description of the new *Austin-Western* hydraulic crane are in this pamphlet. Working ranges, attachments, and manual boom extensions are some other points of interest. (122)

ECONOMY FORMS. Get this leaflet to discover how to save money and time with *Economy* forms which are available on a outright purchase or rental basis. (123)

SIMPLE MOISTURE CONTROL. This *instant Moisture Control* meter gives improved concrete quality, decreases operating costs, and assures full yield with many other convenient and vital features. (124)

AIR ENTRAINER. *Ad-Aire* when added to your concrete at the mixer forms microscopic, non-connecting air-bubbles to make concrete more workable, more durable and faster setting according to this bulletin. (125)

FORK TRUCKS. Tracto-Lift describes their fork trucks in this booklet, emphasizing their ruggedness and durability. Due to its ingenious design it can perform many duties with equal ease. (126)

LOW-COST AGGREGATE. With the Jeffrey "strait-flo" cinder preparation system up to 16 cents per yard may be saved on hammers and roll shells alone, according to this leaflet. (127)

HEAVY CONSTRUCTION. If you've any big construction projects in the offing you will be sure to want this interesting booklet on Preload's new licensing program for prestressed construction. (128)

WINTER CONCRETE. How to get winter concrete faster, safer and with better quality is the interesting topic of these Solvay leaflets which give full particulars on the use of their high quality calcium chloride. Complete information on its use with portland cement is also featured. (129)

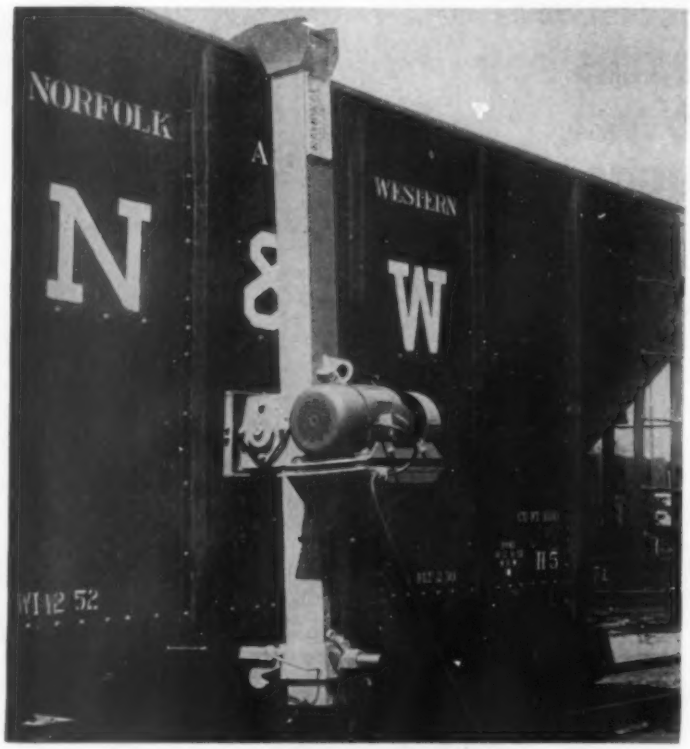
TILE EQUIPMENT. Hydrotile announces a new line of pipe and tile machinery in this prospectus which they say eliminates the two main headaches of producers—belts and sliding keyways. (130)

BLOCK EQUIPMENT. Besser Mfg Co. offers in this series of brochures a well-illustrated summary of many of their products, including Beslite (a lightweight aggregate), Block machines, cube designs, batch mixers, and block cubers. (131)

QUIET VIBRATOR. Martin Engineering Co. claims in this bound booklet that their Vibrolator is the worlds quietest vibrator. In it they give a complete explanation of the manner materials flow to the harmonics set up by circular action of their Vibrolator. (132)

COMPLETE EQUIPMENT. This spiral-bound attractive bulletin describes fully the manufacturing activities of the Blaw-Know Co. Chief emphasis is placed upon products and services and their industrial applications. (133)

MEET A MONEY SAVER



Latest Model "C"

A NATIONAL CAR SHAKER, in service 4½ years at a ready-mix plant, has unloaded over 1 million tons of sand and gravel in all kinds of weather. Only one man has operated the shaker. Estimated savings — $23,000.

NATIONAL CONVEYOR & SUPPLY CO.
348 N. Harding Avenue
CHICAGO 24, ILL.

HEIGHT CONTROL. The Zero-matic automatic height control made by Bergen automatically adjusts the cutoff bar each time that more or less material is required in the mold without stopping the machine. It is available for use with Tri-Matic and Vibrapac block machines according to this brochure. **(134)**

POWER UNITS. Willys 4- and 6-cylinder power units are described in this booklet which stresses their adaptability, ruggeness, low cost and trouble-free service. **(135)**

NO MORE RUST. Overust anti-rust paints offer this 4-page leaflet which give chemical properties, application methods and coverage figures on their complete list of paints. **(136)**

MIXER. A specification sheet for Worthington's Blue Brute 6-S concrete mixer details the specifications and lists standard as well as optional equipment available. **(137)**

WATERPROOF. In a recent test test Haynes Formula no. 640 was sprayed with water for a period of 24 hours and absorbed only 3/100 of one percent in weight of water. **(138)**

CONTINUOUS FEEDING. Jet-creter model 240 is able to be continuously fed by the use of an independent source of compressed air and through its careful design it requires only a bare minimum of air. **(139)**

NO MORE DIRT. Dirty pallets are a thing of the past once a Beals automatic pallet cleaner made by Springfield pallet cleaner and Mfg. Co. is installed at your plant. **(140)**

BOILER SCALE. A "sure fire" method to remove and prevent scale in boilers and water heaters, based on a new scientific principle, is described in this *Evis* water conditioner bulletin. **(141)**

ELEVATOR BUCKETS. This 12-page *Standard Metal* catalog lists all pertinent data and prices on its line of steel elevator buckets. **(142)**

SPLIT PIPE. Cast in half-circle sections, *Split-Locke* concrete pipe is bolted together to form a rigid, strong monolithic structure in diameters from 30 to 102 in. **(143)**

NON-SHRINK GROUT. This 16-page booklet discusses the *Embeco* non-shrink method of grouting devised by *Master Builders* to counteract shrinkage although completely flowable. **(144)**

COMPLETE PLANTS

from a Single Source

- "Tilt-Up" Mixers
- Ready-Mix Plants
- Expressway Semi-Portable Plants
- Dry Batch Plants
- Cement Bins
- Aggregate Bins
- Cement Storage

ENGINEERED TO WORK TOGETHER

From conveyor to elevator, from bin to mixer Burmeister equipment is designed and built by the same organization. Because each product is *"engineered to work together"* you are assured less costly "conversions," maximum production speed, accurate delivery of materials, and greater economy of operation. See your nearest Burmeister Distributor or write for details.

FREE CATALOG

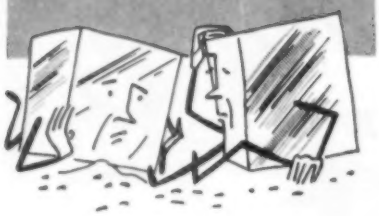
Send for new 16-page illustrated Catalog of Burmeister Plants and Equipment.

COMPLETE PLANTS FROM A SINGLE SOURCE

Burmeister

L. BURMEISTER CO., 4531 W. MITCHELL ST., MILWAUKEE 14, WISCONSIN

The case of the grounded ice cubes...



The operations of a Buffalo ice-making plant came to a costly impasse. Ice cubes were grounded for want of some way to unclog their transporting devices. Hammering was slow and often damaging to the equipment.

There was a solution, however, that solved the problem economically and swiftly . . . a CLEVELAND vibrator.

Let us know about ***your*** *grounded material, or ask for our detailed literature. Engineering recommendations without cost or obligation.*

AIR *and* ELECTRIC

Bin Stuck Lately?

THE CLEVELAND VIBRATOR COMPANY

2710 Clinton Avenue • Cleveland 13, Ohio

W. H. Carroll

William H. Carroll has been appointed regional sales manager for the Concrete Transport Mixer Company, St. Louis, Mo., manufacturers of the Rocket and Hi-Lo Truck Mixers, according to Otis H. Manchester Jr., secretary-treasurer.

Mr. Carroll will direct sales and sales promotion for both inclined-drum and open-top truck mixers in Texas, Oklahoma, Louisiana, and Arkansas. He has done sales work with R. G. LeTourneau, Caterpillar, Bucyrus Erie, and also construction work with Merritt-Chapman & Scott.

William F. Rutherford has been named eastern field engineer for the Air Placement Equipment Company, Kansas City, Mo. He will direct sales and service for the company's Bondactor concrete gunning equipment and Mix-Elvator, a portable, combination mixer, proportioner, and elevator. Mr. Rutherford will serve all of the eastern states from his headquarters at 111 E. Jerald Street, Highland Springs, Va. He will also be available for consultation on concrete, refractory, insulation, and other air placement application problems.

Certain-Teed Products Corporation, 100 East 42nd Street, New York, has been appointed exclusive export distributor for the sale of Drycrete integral waterproofing in 27 countries, according to an announcement by the Shield Chemical Corporation, Verona, N. J., manufacturers of Drycrete. The countries include South and Central America, Canada, Mexico, the Caribbean islands and the Union of South Africa.

Hultquist New Engineer For Michigan Pipe Association

Harold M. Hultquist has been appointed field engineer for the Concrete Pipe Association of Michigan, Inc., which represents the 10 principal manufacturers of concrete pipe and allied products in Michigan.

Mr. Hultquist, a 1949 civil engineering graduate of the University of Michigan, is a member of the Michigan chapter of A.S.C.E., and served 3½ years with the U.S. Marine Corps during World War II.

Get 4 BIG ADVANTAGES with Servicised White Pigmented Concrete Curing Compounds

1. Fast, positive coverage... no missed spots
2. Reflects heat—reduces concrete temperatures 15° F.
3. Saves material... no waste or overlap
4. Does not run on sloping surfaces—"stays put" after application

Servicised White Pigmented Curing Compound is widely used in areas where atmospheric temperatures exceed 80° F. because it produces a membrane capable of reflecting heat to reduce concrete temperatures as much as 15° F. Even application, using minimum material and application time. May be sprayed or brushed.

Write for complete details and circular on Servicised Concrete Curing Compounds.

SERVICISED PRODUCTS CORPORATION
6051 West 65th Street, Chicago, Illinois

LWA?

Do you produce material used as lightweight aggregate?

Do you mine any mineral suitable for lightweight aggregate?

IF SO, SEND ALL DETAILS TO

JOHN PETER FLYNN,
Director of Research

PIT AND QUARRY PUBLICATIONS

431 So. Dearborn St., Chicago 5, Ill.

REVOLUTIONARY NEW SWIVEL FRAME BOOSTS TRUCK LIFE AND TRACTION!

STRONGER THAN EVER! EASIER TO DRIVE! GREATER PROTECTION FOR TRUCK, BODY AND LOAD! Now your trucks can travel the roughest terrain—without frame twist or distortion—assured of traction and maneuverability never before possible!

For Swivel Frame permits the front and rear halves of a truck to rotate to either side independently. No sprung cabs or jammed doors; no front wheel fight; no frames "dying from fatigue". Chances of damage to body, chassis and load are practically eliminated.

Swivel Frame consists of two heavy-duty box sections (placed where frame is divided) joined by a high-strength alloy-steel tube. All bearings are dust and dirt-sealed. Swivel Frame installations are stronger than original truck frame members . . . have been *proved* on thousands of miles operation in many varied off-and-on road vocations.

Slash maintenance costs, lengthen service life and increase your truck's ability to go places with Swivel Frame! Low-cost models are engineered for all popular make trucks and all types of drives. Send for full details today.

Truckstell

MANUFACTURING COMPANY

Makers of famous Truckstell Dual-Axle Drives, Hydro-Trac 3rd Axles, auxiliaries and other types of special truck equipment.

Truckstell Manufacturing Company, Department S-2
Union Commerce Bldg., Cleveland 14, Ohio

Rush me your new, illustrated Swivel Frame folder and name of nearest Truckstell Distributor.

NAME_____

FIRM_____

ADDRESS_____

MAKE OF TRUCK(s)_____

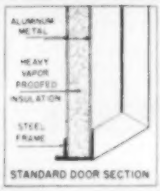
SAVE FUEL • REDUCE CURING TIME
CUT COSTS • UP PROFITS
with *Standard* KILN DOORS!

WHERE AISLE SPACE IS LIMITED STANDARD sliding doors need no aisle space. The carrier-type door (shown) requires 15" minimum clearance above top of door opening. A vertical sliding door, counterweighted for easy opening, is also available.

WHERE HINGE-TYPE DOORS ARE PREFERRED Choose from two STANDARD hinge-type doors. The top-hinging door (shown) can be used when there's insufficient room at sides of door. The conventional side-hinging door has rugged hinges and positive-seal lock.

CHECK THESE FEATURES

- ✓ Heavy Aluminum Sheets on Both Sides of Thick Vapor Proofed Insulation.
- ✓ Rugged Steel Frame.



STANDARD DOOR SECTION

Get the Best — Send for Details Now

STANDARD DRY KILN COMPANY

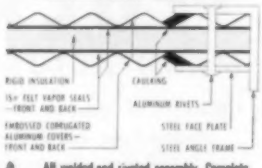
P. O. BOX 5708 . . . . INDIANAPOLIS 21, IND.

Be sure it's got GUTS!

Above: Universal Doors and Carriers in use at Angelus Block Co., Burbank, Calif., one of the West's oldest and largest block producers.

Kiln closure equipment is no place for tin-pan construction. Be sure the equipment *you* buy has the *guts* to give you efficient operation and long trouble-free service. Write, wire, or phone for detailed information.

PARTIAL DOOR SECTION

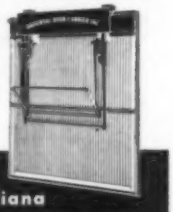


All welded and riveted assembly. Complete internal drainage system for condensation.

Universal

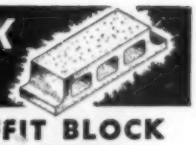
KILN DOORS and DOOR CARRIERS

50th Anniversary 1904-1954



UNIVERSAL DOOR CARRIER, INC.
1117 Cornell Ave., Indianapolis 2, Indiana
"SPECIALISTS IN KILN CLOSURE EQUIPMENT—SINCE 1904"

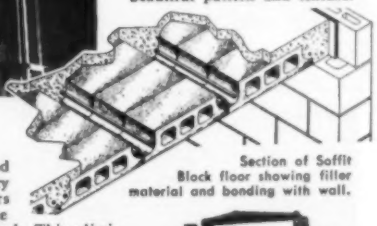
SELL MORE BLOCK ON EVERY JOB!



Furnish VIBRAPAC SOFFIT BLOCK for ALL FLOORS and ROOFS

Permanent, Fireproof Floors and Roofs. Low initial cost and maintenance. Natural base for radiant heat installations. Provide surface of maximum acoustical and insulation value. Can be plastered, or if left exposed, makes a ceiling of beautiful pattern and texture.

Removing Centers from Finished Floor.

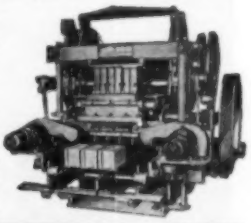


Section of Soffit Block floor showing filler material and bonding with wall.

Soffit Block are supported in place with temporary adjustable steel centers while reinforced concrete slab is placed and cured. This eliminates timber shoring and leaves space below clear during construction.

BESSER VIBRAPAC PRODUCES SOFFIT FLOOR AND ROOF UNITS

The same machine that produces high quality concrete masonry units in all styles and sizes, using Plain Pallets. Continuous, full capacity operation. Fully automatic. No machine operator required.



BESSER MANUFACTURING CO.
ALPENA, MICHIGAN, U. S. A.
Complete Equipment for Concrete Products Plants

A 5867-¼R2

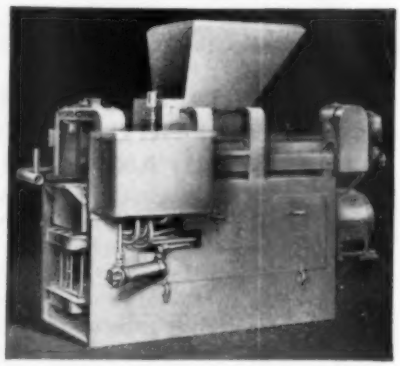
Available

ON LEASE

to Men of Responsibility

HYDRO KORPAK

. . . the Superfine Block Machine



A limited number of Hydro-Korpak Machines will be made available to reputable manufacturers on a monthly rental basis. Write at once for details of an arrangement which can greatly reduce your overall operating costs.

CONCRETE EQUIPMENT CO. • 531 Ottawa Ave., Holland, Mich.
CANADA: Dunn Masonry Machinery, Ltd. 998 Dundas H'way, Cooksville, Ont.

K-2

Insure future sales by promoting Concrete Masonry Houses...

Your biggest Untapped Market

Most of the homes constructed today—about 8 in every 10—are built of short-lived materials that require continuous maintenance. They are subject to destructive attacks by vermin and termites, decay and fire.

What a tremendous opportunity for aggressive promotion by concrete masonry producers!

Double or treble the present number of masonry units going into home construction. See what would happen to your sales volume? What can you do to accomplish this?

1. Describe the beauty, economy and structural advantages of concrete masonry homes in *all* of your advertising.

2. Invite interested persons to request additional information from you about the advantages of concrete masonry construction.

3. Suggest names of builders, architects and lending agencies experienced in constructing, designing and financing concrete houses.

Such a program could assure you your share of sales in your greatest untapped market.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

truck-men DO MORE FOR LESS . . . Says F. F. KIRCHNER

Model 40 loading a cube of blocks on truck

Model DHP with empty rack in front of kiln

"We have one two-ton Truck-Man Model 40 High Lift and two 4,500 lb. Truck-Man Model DHP's," says Mr. Kirchner, of F. F. Kirchner Material Company, St. Louis, Missouri. "What a combination! One DHP shifts loaded racks from the block machine to the kilns, from the kilns to the cubing area and then takes the empties back to the machine. The 40 takes the cubes to the yard, loads cubes from the yard on highway trucks and even unloads bagged cement and other materials that we receive. The other DHP is used for odd jobs and as an auxiliary in shifting racks when we are rushed.

"We've really got the handling problem licked now," he continues, "That DHP is the most efficient little work horse I've seen and it's so darned economical. Moving loaded racks eight hours a day on two gallons of gas —it's almost unbelievable.

"As for the Model 40, it's easy to see that it was designed from the ground up for block plant use.—Rugged, maneuverable, plenty of power, easily maintained and those big tires can go any place.

"Like everyone else, we're watching costs these days. So we were pleasantly surprised to find we could buy all three of these trucks for a lot less than the cost of two ordinary fork trucks. Our experience has proved to us that they are more efficient and versatile, too."

For information on how Truck-Man can cut costs in your operation, complete and mail this coupon today.

truck-man
DIV. OF KNICKERBOCKER CO.
571 LIBERTY STREET, JACKSON, MICHIGAN

☐ Have Salesman Call ☐ Send Info on Model 40
☐ Send General Catalog ☐ Send Info on Model DHP

NAME .....
ADDRESS ..... ZONE .....
CITY ..... STATE .....

PENN-DIXIE CEMENT
Corporation

Offices:
New York, N. Y.
Boston, Mass.
Nazareth & Philadelphia, Pa.
Atlanta, Georgia
Des Moines, Iowa
Chattanooga, Tenn.
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Plants:
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Penn Allen, Pa.
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West Des Moines, Iowa
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STOP BEATING YOUR MIXER

to clean it!

use...EDI-COTE No. 103

the revolutionary new release agent that prevents concrete from bonding to mixer blades and parts.

Edi-Cote #103 will eliminate the use of air-guns and sledge hammers in the daily clean up. Edi-Cote #103 creates a non-hardening film which prevents the forming of a bond between concrete and metal. It adheres rigidly and will not dissipate due to chemical action or abrasion. One application of Edi-Cote #103 will remain effective throughout the longest working day.

ADVANTAGES:

1. Allows simple removal of built up concrete; no pounding or chipping required.
2. Elimination of hammering and chipping greatly increases the life of mixer and machinery.
3. Clean up time is shortened with substantial savings in time and labor.
4. Transparent; will not darken concrete.
5. Makes a hard job easy; your men will like it.
6. Economical; costs but a few cents a day.

Edi-Cote #103 is applied with brush or spray. When used, large chunks of concrete are easily removed with a putty knife, while the residue in corners and crevices can be brushed out with a whisk broom.

NOTE! Edicote #103 was designed specifically for this problem and should not be confused with form or paraffine oils.

Shipped in 55 gallon drums, with 5 gallon cans available for trial orders. Order Edi-Cote #103 today!

EDICK LABORATORIES **DEPT. 21-D**
4917 N. SANTA MONICA BLVD. **MILWAUKEE 17, WIS.**

NOW MORE THAN 150 *LICENSED MANUFACTURERS*
Producing
Patented
homeward
***Concrete* STEPS**

A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.
For Complete Information Write
ROGER F. WILLIAMS, Licensor
3420 S. W. 9th St. Des Moines (15), Ia.

DEPENDABLE
FOR 50 YEARS
Woven Wire
ALLOY SCREENS
TWIN CITY IRON & WIRE CO.
St. Paul, Minnesota

Increase BLOCK Output with a Sturdy Erickson

The Platform Truck "Custom-Built" for your racks—from 60 to 108 or more 8x8x16 blocks.

"THE BACKBONE OF BLOCK PRODUCTION" is what users still call the Erickson Platform Truck. Its rugged dependability to handle loaded racks from block machine to kiln assures top speed production with no delays or shut downs. The Erickson platform picks up all racks from the ends and places them close together in the kiln—no wasted space. For faster operation Erickson now offers 4 speeds forward and 4 speeds reverse. We will build you a truck exactly suited to your racks and doorways. Also fork type trucks.

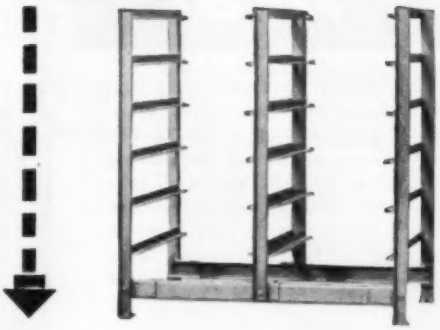
Write for Catalog on Complete Line.

Erickson POWER LIFT TRUCKS, Inc.

211 St. Anthony Blvd., N.E. - Minneapolis 18, Minnesota

CHASE BLOCK RACKS, PLAIN STEEL PALLETS

Your best buy

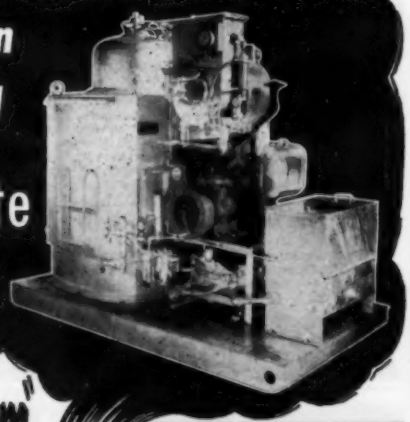


Here's why . . . Standard style or specially designed, Chase racks meet your requirements. They're shipped painted and knocked down—assembly is easy—no special tools or welding needed. Chase experience means low prices and years of dependable service. Check Chase prices.

Chase FOUNDRY & MANUFACTURING CO.

2300 PARSONS AVENUE • COLUMBUS 7, OHIO

Modern Curing FOR Concrete Block



"Kwik-Steam" GENERATOR

Curing Concrete Products by Steam now can be done the "Low-Cost" way by using a Littleford "KWIK-STEAM" Generator. These compact units are the fastest steam-producing generators ever designed, *they deliver steam in 2 minutes' time from a cold start,* and only operate when steam is needed. Being fully automatic they require little attention and do not need a specially trained operator. Made in models to fit any curing space; sizes range from 20 to 165 B. H. P.

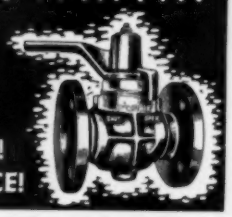
Cut your curing time and curing expense, have a "KWIK-STEAM" Generator on the job.

LITTLEFORD

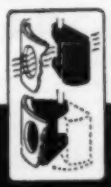
LITTLEFORD BROS., INC.
403 E. Pearl St.
Cincinnati 2, Ohio

WHETHER THE MIXTURE IS THICK OR THIN...

DeZURIK VALVES
HANDLE CONCRETE
WITHOUT LEAKAGE!
WITHOUT LUBRICATION!
WITHOUT MAINTENANCE!



DeZurik Easy-Operating Plug Valves are "naturals" on lines handling cement, or concrete mix, whatever the consistency. DeZurik's rubber-faced plug seals tight despite sand or aggregates in the flow, opening full or closing tight with an easy quarter-turn. DeZurik Valves require only an absolute minimum of maintenance; minor plug wear is self-compensating, and journals are non-lubricated. In case after case, when DeZurik Valves were installed, they drastically reduced replacement costs.



Manufactured in a full range of sizes and models.
Write for details and recommendations.

DeZURIK SHOWER CO.
SARTELL, MINNESOTA

Supplementary Heat

HY-LO Oil Burning Salamander—the ideal all purpose heater to keep men and equipment working. Produces up to 140,000 BTU per hour—uses any good grade fuel oil—one filling lasts 10 to 20 hours burning ½ to 1 gallon per hour. This low cost all purpose heater is the answer to emergency or permanent space heating. No other portable heater produces so much clean heat at so little cost. Nationally used.

Dealer inquiries invited.

Distributors in all principal cities—write or wire for nearest distributor.

HY-LO
Oil-Burning Salamander

HEATING • DRYING • THAWING • COMFORT HEAT

SCHEU PRODUCTS COMPANY
299-K STOWELL • UPLAND, CALIF.

Speed Up Hand Work with the BIG BULLY AIR HAMMER

- Clean Equipment
- Shape Dry Concrete
- Clean Forms

Clean Mixing Trucks Faster
Clean Fragile Mixing Equipment Safely
Vibrating Concrete From Hopper

Weight only 50 oz., 6 in. length, fits hand easily. Exclusive metering trigger delivers 0 to 9000 blows per minute. 28 tools available for 100 different jobs. Special tools made at your request.

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Cleveland 25, Ohio

West Coast Office
15615 Arrow Highway
Azusa, California

Canadian Office
347 Cannon Street, East
Hamilton, Ontario

CEMENT COLORS with these 3 important features:

- Reichard-Coulston synthetic and natural cement colors are limeproof.
- Reichard-Coulston cement colors are weatherproof.
- Reichard-Coulston pigments conform to all cement and concrete specifications for color.

Choose from a wide range of Reichard-Coulston natural and synthetic cement colors: reds, yellows, browns, green. For FREE color card, write today.

REICHARD-COULSTON, INC.
15 East 26th St., New York 10, N.Y.

OUR 100th YEAR: 1854-1954

FACTORY: Bethlehem, Pa.
OFFICES in Boston and Chicago
WAREHOUSES in Principal Cities in U.S.A. and Canada

FREE Color Card

Reichard-Coulston, Inc. CM-114
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Gentlemen: Please send me a free card of Reichard-Coulston cement colors:

Company_____

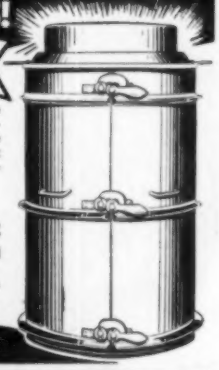
Attention_____

Street_____

City_____ Zone____ State_____

FOR THE FINEST CONCRETE PIPE... YOU NEED FINEST FORMS!

THE Quinn Standard



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

• QUINN HEAVY DUTY PIPE FORMS

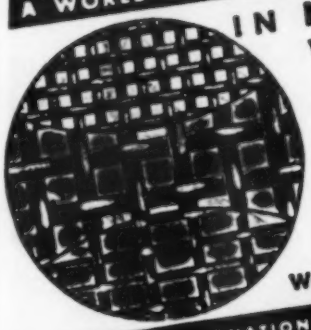
For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of
QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS
BOONE, IOWA

Industry has A WORLD OF CONFIDENCE IN NAT-ALOY WIRE CLOTH



COVERS EVERY REQUIREMENT

. . . for a dependable, long-wearing, non-crystallizing Screen Cloth. Has "Nat-Aloy" Lock Crimp Meshes. Preferred for screening accuracy, economy and serviceability. All Sizes — All Meshes — All Gauges.

Write for Catalog No. 55

NATIONAL WIRE CLOTH CO., INC.
St. Paul, Minn.

MOISTURE CONTROL PROBLEM
SOLVED

P & S MOISTURE CONTROL METER EQUIPPED WITH ELECTRONIC DUAL-RANGE CONTROL FOR ALL AGGREGATES.

NEW, HARD, 50 TO 60 ROCKWELL MIXER ELECTRODES, FOR LONGER WEAR.

CUSTOMER CAN INSTALL AND SAVE.

COMPLETE PRINTS AND INSTRUCTIONS FURNISHED.

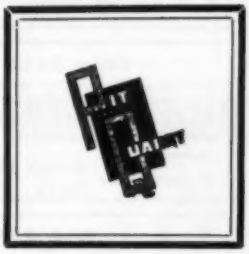
FOR PARTICULARS WRITE, WIRE OR PHONE, GIVING MAKE OF MIXER, SIZE AND YEAR MODEL

ROY DARDEN INDUSTRIES, INC.

P. O. BOX 95 NORTHSIDE STA., ATLANTA, GA. **PHONE CHAMBLEE, GA. 7-2567—7-2568**

OVER 17,000 POTENTIAL BUYERS

AT YOUR FINGERTIPS



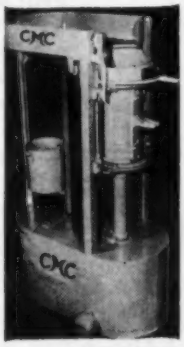
LIST YOUR USED EQUIPMENT OFFERINGS REGULARLY in the * BROADCAST SECTION of

PIT AND QUARRY

431 So. Dearborn St. Chicago 5, Ill.

The meeting place for buyers and sellers

*Largest Classified Advertising Section Serving the Industry



Here's Your Big Money Maker!

One machine to make drain tile in all the popular sizes. **TURN CONCRETE INTO GOLD SHECKLES** with the **MARVEL 8.**

- Modest Investment
- Low Operating Expense
- All year demand for **MARVEL TILE**

Bulletin and facts sheet upon request. Write today!

Concrete Machinery Company

Hickory 21, North Carolina

The World's Largest Manufacturer of Aluminum Molds for Concrete Yard and Garden Ornaments.

RIGHT THIS WAY for *extra* CONCRETE PROFITS

Build Premium Septic Tanks with

CARPENTER **Forms and Equipment**

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Concrete Manufacturer Classified Section

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NEW YELLEN Hi-SPEED
PLAIN PALLETT
BLOCK MACHINE
THE NEWEST LOW COST
PLAIN PALLETT MACHINE
THOROUGHLY TESTED
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PALLET RINGS
Write for full information
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All shades and grades the highest quality.
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Hydro-Korpak machine, excellent cond., 3 yrs. old. 4, 8 and 12-inch setups with clean pallets, 2,000 8", 500 4", 600 12". 25 48-block racks. Dunn 10-ft. mixer, 10 HP motor. 18-ft. elevator with motor. Kent pallet oiler. Hand lift truck, rubber tires. Clark 4,000-lb. fork lft. hard tires. Will sell $6,000. Terms, $3,000 down, $3,000 in 15 mo. plus 6% int.

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Advertising necessities for the block industry. Line Pins, Twigs, Modular Coursing Stick. Also the new Block Calculator and Wood Corner Block. All imprinted with your advertising. Complete catalog on request.

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STUCCO-PLASTER-CONCRETE

"Fine Because of Their Fineness"
Ask for samples and recommendations.
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STOP that WATER

With FORMULA NO. 640

A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly — no mixing — no cleanup — no furring — no membranes. Write for technical data—free sample.

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FOR RENT

Several 5 & 6 yd. Ready Mixed Concrete trucks & Mixer with operator.

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CONCRETE MANUFACTURER
431 S. Dearborn St. Chicago 5, Ill.

I—Erickson F-5 fork lift truck. Sideshifter and 6 forks. 18 months old, Good condition.

I—4,000# Clark fork lift truck. Pneumatic tires. Good condition.

I—Truckman platform truck with power lift. Like new $650.00.

I—6,000# Elwell Baker gas, electric lift truck. Good condition $750.00.

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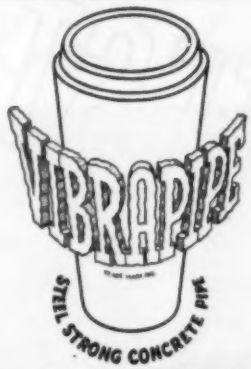
For Best Results Advertise In The Concrete Manufacturer Classified Section

FOR SALE

L-5 Lith-I-Block three block machine, new 1951, complete with moulds and attachments for all sizes of blocks and quantities of spare parts; replacing with new equipment; available immediately; priced to sell.

BUILDER'S BLOCK COMPANY
1815 Prospect Ave., Kansas City, Mo.
Telephone: Chestnut 5197



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P. O. BOX 452
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Concrete Pipe Forms & Vibrators

COLORS *For Cement and Concrete*

COLOR YOUR CONCRETE WITH LANSCO CEMENT COLORS, available in 40 ATTRACTIVE shades. Suitable for all types of concrete products. Write for our new color card, copy of "Suggestions For Using Cement Colors", and for free samples and price list.

Manufactured by:

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36" — 3—4 foot McCracken joints
65 Mortar Joint pallets
Packer head, etc.
21" — 4—4 foot McCracken Jackets
175 Mortar joint pallets
packer header, etc.
27" — 3—4 foot McCracken Jackets
130 Mortar joint pallets
packer head, etc.
24" — 3—complete forms, 6 foot length
1—complete form, 4 & 6 ft. comb.
2—cores
1—header (Tylox)
1—table master pallet
1—centering plate
expenders & aluminum rings
45—groove forming pallets (Tylox)
18" — 2—complete forms & cores—
6 foot lengths
1—centering plate
1—header (Tylox)
3—liners (Tylox)
3—expanders
1—table master pallet
30—groove forming pallets (Tylox)
15" — 2—complete forms & cores
6 foot lengths
1—centering plate
1—header (Tylox)
3—expanders
3—liners (Tylox)
1—master table pallet
30—groove forming pallets (Tylox)

The 18" and 15" are practically new, used only two months.

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ARE YOU LOOKING FOR USED EQUIPMENT?

Many of our customers who buy a BERGEN TRI-MATIC have equipment they wish to dispose of. We can very often arrange a good buy if you are looking for used machinery. Write us about your requirements, whether you need one item or a complete installation.

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Nutley, New Jersey

FOR SALE

2000 Pressed steel manhole block pallets, code "Magic".
Joltcrete #9 with Offbearer, 8" Mold and Pallets. Excellent condition.
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FOR SALE — MUST SELL!

BESSER SUPER TAMPER — Makes 2-8" at a time. Produces 780-8" or 390-12" per hour. Good condition. Fully Automatic. All sizes of modular dimension.
APPROXIMATELY 1,800 PLAIN STEEL PALLETS (¼x16½x18).
APPROXIMATELY 70 STEEL WELDED RACKS, holding 72-8".
ENTIRE PACKAGE FOR $5,500, OR ANY PORTION AT A REASONABLE PRICE.

BOX NO. Q-133, c/o THE CONCRETE MANUFACTURER
431 So. Dearborn St. Chicago 5, Ill.

WANTED

Manager job for a Ready Mixed Concrete Plant. Can furnish excellent references upon request. 15 years experience.

BOX NO. L-109, c/o THE CONCRETE MANUFACTURER
431 S. Dearborn St. Chicago 5, Illinois

IMMEDIATE DELIVERY

Factory Rebuilt Columbia Model #8 Automatic complete with 8" Standard Mold.....$7500.00
Also Semi-Automatic Model #8 complete with 8" Standard Mold..... 5500.00
F.O.B. Mukwonago, Wisconsin

CONTACT
Columbia Machine, Vancouver, Washington
or
Columbia Machine, Mukwonago, Wisconsin

PLAIN STEEL PALLETS

Furnished from prime domestic open hearth mild steel plate.

Guaranteed Quality
Flat • Square • Accurate
any size or thickness

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PACKER-HEAD WINGS
Proved to last as long or longer — yet cost considerably less. Write for prices.
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You too can dispose of your surplus equipment at very small cost. P & Q's 18,000 readers are your potential buyers. You don't have to stir out of your chair to meet the men who want to buy the equipment you offer for sale.

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PIT AND QUARRY CLASSIFIED SECTIONS
431 South Dearborn St. Chicago 5, Illinois

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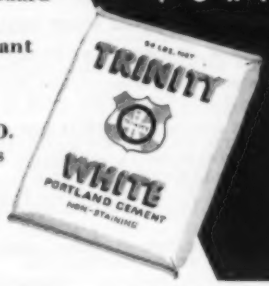
A product of GENERAL PORTLAND CEMENT CO.
CHICAGO • DALLAS • CHATTANOOGA • TAMPA • LOS ANGELES

As white as snow

Trinity White
PORTLAND CEMENT



Whitest in the bag
Whitest in the mix
Whitest in the completed job

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Every issue of PIT AND QUARRY is full of information you can use in your business. It gives you practical ideas on every phase of your operations.

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My Name..... Title.....

Company Name.....

Send to (address).....

We produce.....

Know the Difference BEFORE YOU BUY

NEW HEAVY DUTY TYPE *Oswalt Block Ejector and Pallet Feeder*

Two U.S. Patents have been allowed on Oswalt improvements; one on Synchronized Vibration, and the other on the Lug Link used in speed-up

Write for name of Oswalt-Serviced plant nearest you.

IF you want to increase the output of your Vibrapac machine, just remember that:—

OSWALT SERVICE

is the original time-tested service that definitely increases Vibrapac production *without sacrifice of quality—with minimum culls or cracking—with uniform height and density—with greater operating economy.*

Complete OSWALT Service includes:

1. **Improved Vibration and Machine Changes**
2. **Simplified Height and Density Control**
3. **Shock-Free Block Ejector & Front-End Pallet Feeder**

Write for OSWALT Booklet for full information

OSWALT ENGINEERING SERVICE CORP.

1335 Circle Avenue, Forest Park, Ill. **Phones: EStebrook 8-3666, FOrest 6-3898**

Make this your BEST year with the BES-STONE Block Splitter

Front view showing operator feeding block into BES-STONE Block Splitter.

Expand Your Opportunities — Cash in on the Split Block demand. Its "quarried stone" character pleases owners. You'll find it ideal for all structures, large or small . . . commercial, institutional or home construction. BES-STONE challenges the creative ability of both architects and builders.

Splitters in 18" and 24" sizes — Automatic, powerful, hydraulic operation . . . up to 960 Split Block per hour. Straight line cuts . . . No cull block. Easily adjustable for splitting various block heights. Block is placed under knife, automatically. And the finished Split Block is automatically removed from under the splitting knife by the incoming block. Quiet, safe operation.

Fast, Accurate

Profitable Producer of 960 Split Block per Hour!

There's big money for you in attractive, permanently colorful BES-STONE Split Block. It complements and increases sales of standard stripper block. Get all the facts. Write for BES-STONE Bulletins 95A and 100.

Note the natural beauty of BES-STONE. No maintenance, no painting, no peeling off.

BES-STONE *the Split Block with Character*

BESSER 50th Anniversary 1904-1954

BESSER MFG. CO. • Complete Equipment for Concrete Products Plants • Alpena, Michigan, U.S.A.

A 7908-½-H

DURING COLD WEATHER You Get STRONGER, BETTER CONCRETE PRODUCTS

At *Less Cost* with . . .

Standard Cement by adding

SOLVAY CALCIUM CHLORIDE

- DOUBLED PRODUCTION OF POURED PRODUCTS
- HIGH EARLY AND ULTIMATE STRENGTH
- 50% REDUCTION IN CURING TIME
- GREATLY REDUCES YOUR COSTS
- LESS BREAKAGE
- EXTRA COLD WEATHER PROTECTION
- SMOOTHER SURFACES—SHARPER CORNERS —MORE ATTRACTIVE PRODUCTS

No matter what type of portland cement you use — standard portland, high early strength, air-entrained or colored cement — SOLVAY Calcium Chloride gives you both *early* and *final strengths* IN HALF THE NORMAL TIME!

Poured and cast products can be removed in *half* the usual *time* permitting double the output of the forms.

With SOLVAY Calcium Chloride you get better workability, increased plasticity, improved appearance, less voids and improved quality in your products.

Send for FREE BOOK containing full details.

At no cost or obligation —we'll mail you — "How to Get Better Concrete Products At Lower Cost." This highly informative book is filled with important information and answers to your questions about the use of SOLVAY Calcium Chloride with all types of cement.

VISIT SOLVAY EXHIBIT BOOTH 206
at Annual Convention of National Sand & Gravel Association
National Ready-Mixed Concrete Association

MAIL COUPON NOW AND GET ALL THE FACTS!

Allied Chemical

SOLVAY PROCESS DIVISION
Allied Chemical & Dye Corporation
61 Broadway, New York 6, N.Y.

Please send me at no cost your book "How to Get Better Concrete Products at Lower Cost."

Name _____

Company _____ **Position** _____

Address _____

City _____ **Zone** _____ **State** _____ **CM-11**

INDEX TO CONCRETE MANUFACTURER SECTION ADVERTISING

Andrews Equipment Service 244

*Bergen Machine & Tool Co., Inc. 229
*Besser Manufacturing Co. 201, 224-225, 238, 247
*Burmeister Co. 235

Carpenter Mfg. Co. 243
Chase Foundry & Mfg. Co. 241
Clark Equipment Co. 249
Cleveland Vibrator Co. 236
Clipper Mfg. Co. 202
Colonial Iron Works 233
Columbia Machine Works 250
Concrete Equipment Co. 238
Concrete Machinery Co. 243

Darden Industries, Inc., Roy 243
De Zurik Shower Co. 241

Edick Laboratories 240
Erickson Power Lift Trucks, Inc. 241

Hoffmann Co., George W. 245

Kent Machine Co. 231

Le Roi Company 251
Littleford Bros., Inc. 241
Lone Star Cement Corp. 198

Medusa Portland Cement Co. 227

National Conveyor & Supply Co. 234
National Wire Cloth Co. 242

Olsen Corp., Gene 221
Oswalt Engrg. Service Corp. 247

Penn-Dixie Cement Corp. 240
Philadelphia Block and Supply Co. 244
Portland Cement Assn. 239
PreCaster, Inc. 232

Quinn Wire & Iron Works 242

Reichard Coulston, Inc. 242

Scheu Products Co. 242
Servicised Products Corp. 236
Solvay Process Division 248
Standard Dry Kiln Co. 238
*Stearns Manufacturing Co. 252
Superior Pneumatic & Manufacturing Co. 242

Thomas Steel Forms 213
Travel Batcher 200
Trinity Div. General Portland Cement Co. 246
Truck-Man Div. of the Knickerbocker Co. 239
Truckstell Mfg. Co. 237
Twin City Concrete Pipe Co. 245
*Twin City Iron & Wire Co. 240

*Universal Door Carrier, Inc. 238

Williams, Roger F. 240

*See also Detailed Information in 1954 Pit and Quarry HAND BOOK and CONCRETE INDUSTRIES YEARBOOK

Save more money by handling bigger loads

—with the world's largest standard lift truck—26,000 lbs.

The Clark-Ross Y-260 will handle bigger outdoor loads than any other lift truck, and it will go places where no other lift truck can travel! This truck is big enough to handle jobs which formerly required a crane and operator, hook man and trucker. It has the utmost traction and flotation—huge 14.00 x 20 tires are standard front and rear, with excellent weight distribution and 9 in. minimum underclearance. Its 17½ ft. turning radius permits it to be used in yards laid out for smaller trucks.

This Y-260 is *built* for 26,000 lbs. (at 36 inches)—not just beefed-up. It's as easy to drive as a truck half its size; power steering and power brakes are standard. And a brake selection switch enables the driver to apply brakes to *either* drive wheel, when one wheel has lost traction in slippery grounds. Maintenance access is excellent, wrap-around counterweight has minimum over-hang, operator visibility is outstanding. In general, *this lift truck is a beautiful brute!*

For big jobs, you'll want more details on the Y-260. Call your local Clark dealer, listed in the Yellow Pages under "Trucks, Industrial," or send the coupon.

CLARK EQUIPMENT

Industrial Truck Division
Battle Creek 90, Michigan

Send details on Y-260

Name_____

Firm_____

Address_____

City_____

"MY BUSINESS DOUBLED...IN 6 MONTHS"

SAYS MR. H. L. JONES...OF BOLIVAR, WEST VIRGINIA

H. L. JONES
BOLIVAR, W. VA.
CONCRETE AND CINDER BLOCKS
BURIAL VAULTS

January 27, 1954

Columbia Machine Works
Vancouver, Washington

Gentlemen:

I installed a new Columbia No. 8 fully automatic, with magnetic offbearer, pallet return, and cleaner and oiler on July 1, 1953.

Since then my business has doubled. Everyone using our blocks has been well pleased. I am more than pleased with the strength and type of block produced by this equipment.

Our daily average is between 500 and 600 8 by 8 by 16 block per hour.

I highly recommend this machine to anyone in the market for new and fast production.

Yours sincerely,

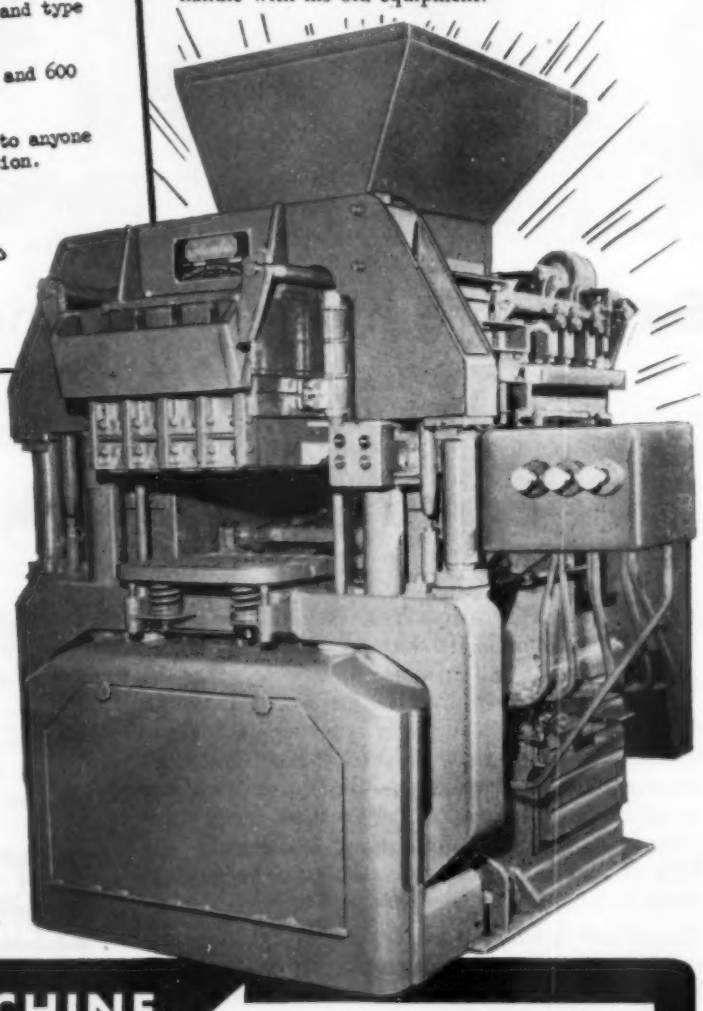
H. L. Jones

H. L. JONES, Owner

LLOYD JONES, Jr.

"OUR *Columbia* MODEL 8 BLOCK MACHINE TURNS OUT UP TO 600 BLOCKS AN HOUR..."

Like hundreds of other concrete block manufacturers, who have installed Columbia Model 8 two-block machines, H. L. Jones of Bolivar, W.Va. has discovered that he can get consistently high production of consistently high quality block. Installation of a single Model 8 fully automatic machine has enabled him to gain *twice* the volume of business that he could handle with his old equipment!



A *Real* PROFIT-MAKER

The Columbia Model 8 is the ideal machine for the block producer who wants fast, automatic production of high quality block. Look at these features:

- **4-6 Cycles Per Minute**
- **Fully Automatic Electronic Controls**
- **Vibration Under Pressure**
- **Standard Plain Pallets**

District Offices in: Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Massachusetts, Virginia and California.

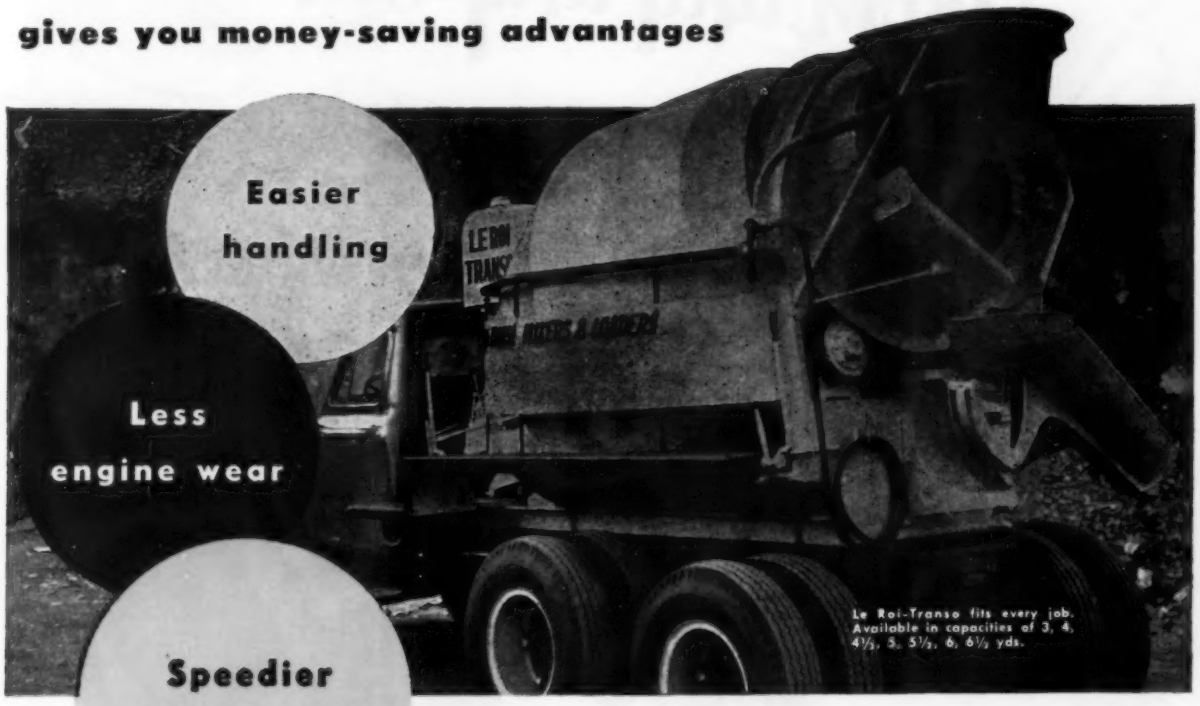
Columbia MACHINE

Home Office: 107 S. GRAND, VANCOUVER, WASHINGTON
Factory Branch and Warehouse at Mukwanago, Wisconsin

Write today for catalog describing Columbia line of one, two and three-block machines!

Patented 2-speed transmission

gives you money-saving advantages



Le Roi-Transo fits every job. Available in capacities of 3, 4, 4½, 5, 5½, 6, 6½ yds.

Good reasons why you should standardize on

LE ROI-TRANSO MIXERS

YOU get top-grade ready mix with real speed and economy, when you mount a money-saving, direct-drive Le Roi-Transo Mixer on your truck chassis.

A Le Roi-Transo Mixer has a patented, 2-speed, planetary, reversing-type transmission that lets you select fast or slow agitating, discharge, or mixing to suit the job. Your engine always runs at its most economical speed — no need for slowdown, even on long hauls. You save engine wear and tear, outages, maintenance.

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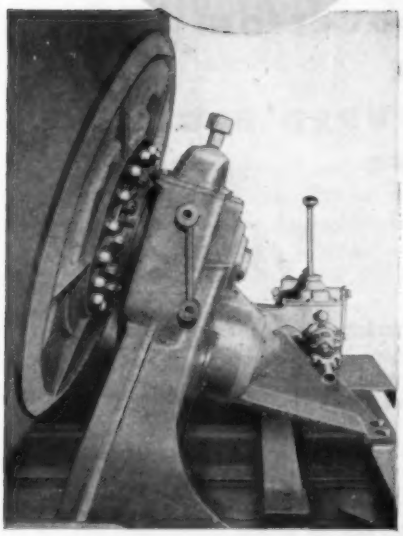
Take advantage of Le Roi-Transo's profitable performance, to cut your costs. See your Le Roi-Transo distributor now. Or, write for bulletin.



Patented Le Roi-Transo direct drive eliminates heavy chains, ring gears, sprockets, and bevel gears — and the maintenance troubles that go with them. Cuts dead-weight as much as 1,000 pounds.

TD-14

LE ROI COMPANY

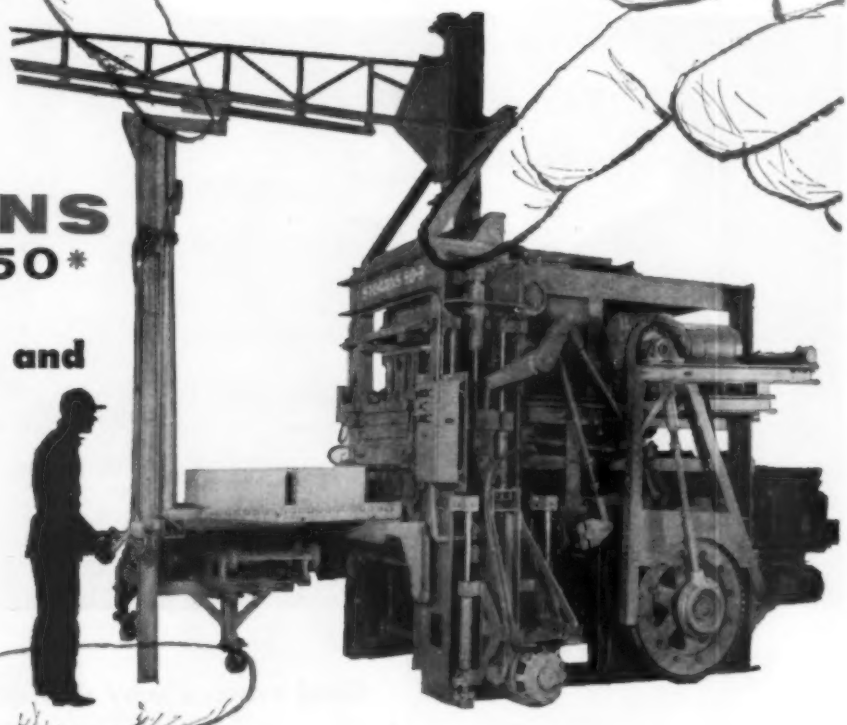
A Subsidiary of Westinghouse Air Brake Co.

TRANSO DIVISION

MILWAUKEE 14, WISCONSIN

Plants: Milwaukee • Cleveland — Greenwich — Dunkirk, Ohio • Coldwater, Michigan.

From any angle...



STEARNS SERIES 50*

Delivers more and better blocks per dollar!

FASTER PRODUCTION

LESS DOWN-TIME

EVEN-TEXTURED BLOCKS

LONGER MACHINE LIFE

Even though you're satisfied with your present plant, you should check and *compare* with Stearns. It pays—in lower unit cost . . . higher profits, because Stearns builds machines that out-perform the field in stamina, long life, low maintenance.

Check Stearns' design—automatic operation—even *automatic* lubrication! Then check Stearns' construction. For instance . . . steel cranks . . . contour-machined, flame-hardened cast steel cams. Fit these and many other Stearns' features into *your* plant, because they spell smoother operation and *more* blocks per dollar. Write today for illustrated brochure.

* *Model 50-1* makes two 8" x 8" x 16" or equivalent units per cycle. Maximum size pallet, 18" x 18½" x 18½".

Model 50-2 makes two 10" x 8" x 16" or equivalent units per cycle. Maximum size pallet, 18" x 18½" x 20½".

Model 50-3 makes three 8" x 8" x 16" or equivalent units per cycle. Maximum size pallet, 18" x 18½" x 26".

YOU CAN DEPEND ON STEARNS

MANUFACTURING COMPANY • INC

ADRIAN • MICHIGAN

FOR LONGER SERVICE • GREATER PROFITS

COMPLETE CONCRETE PRODUCTS PLANT EQUIPMENT • STANDARD OF THE INDUSTRY

HOW GREAT LAKES CARBON CORPORATION

"QUENCHES ITS COKE" with a Plymouth Locomotive

"Quenching coke" is a fascinating step in the production of high quality foundry coke. Red hot coke is pushed out of the ovens into the steel quencher car. The car is then run beneath the quencher tower and water is sprayed on the glowing coke, making a spectacular steam cloud.

At the St. Louis, Mo., Merchant Coke plant of Great Lakes Carbon Corporation, the quenching operation never ceases . . . and the 25 ton Plymouth Locomotive, with special raised cab for maximum visibility over the quencher cars, is in operation 24 hours a day, 7 days a week, with only time out for routine maintenance! Another powerful Plymouth, a 50 ton DE, works a double shift, 70 hours a week, switching coal and coke cars over the company's 7 miles of track. The operators like the simple operation, the dependable, continuous service they get from Plymouth, and this reliability is reflected in operational savings.

Find out how Plymouth performance can give you the same satisfaction, economy, and dependability on all your hauling jobs. Write today for information. Models from 3 to 70 tons, choice of Diesel or Diesel electric power, mechanical or Torqomotive Drive. Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Dept. A-15, Plymouth, Ohio.

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Torqomotive Drive:—Plymouth transmission with hydraulic torque converter.

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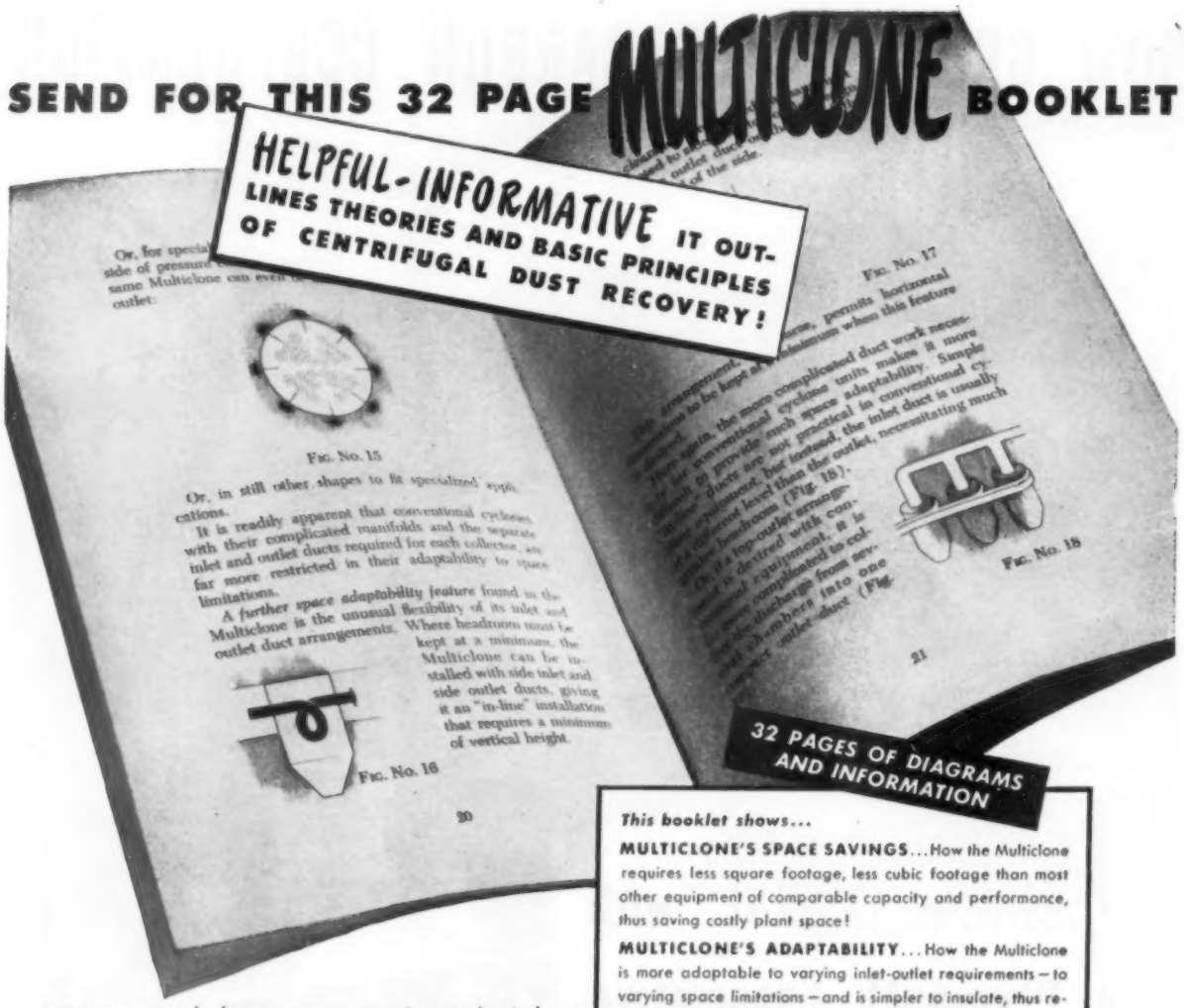
HELPFUL-INFORMATIVE IT OUTLINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL DUST RECOVERY!
FIG. No. 15
Or, in still other shapes to fit specialized applications.
It is readily apparent that conventional cyclones, with their complicated manifolds and the separate inlet and outlet ducts required for each collector, are far more restricted in their adaptability to space limitations.
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FIG. No. 16
20
FIG. No. 17
FIG. No. 18
21
32 PAGES OF DIAGRAMS AND INFORMATION

NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

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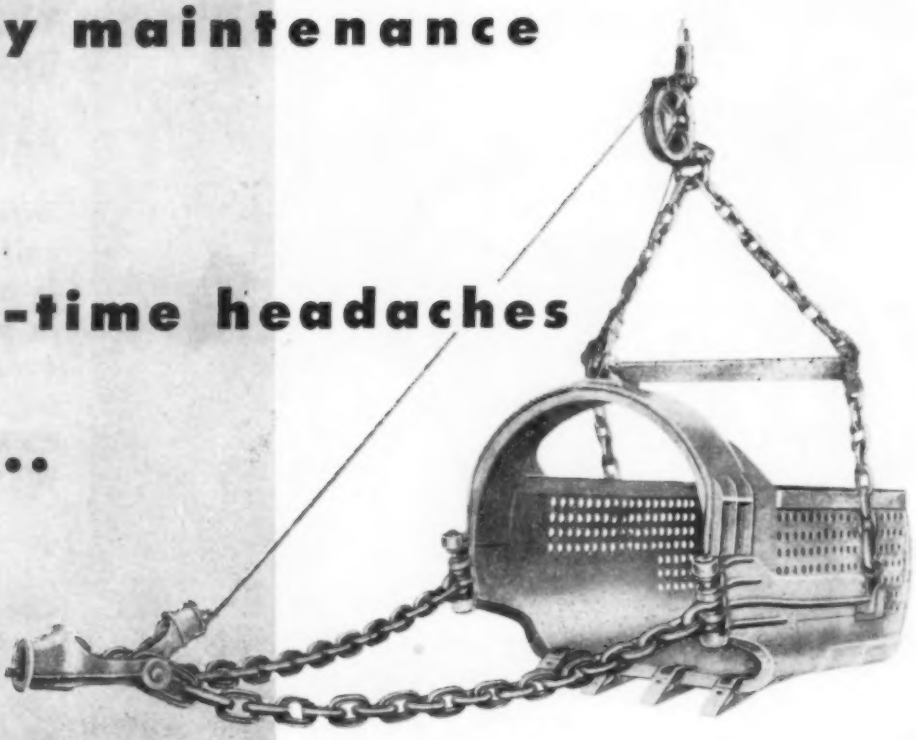

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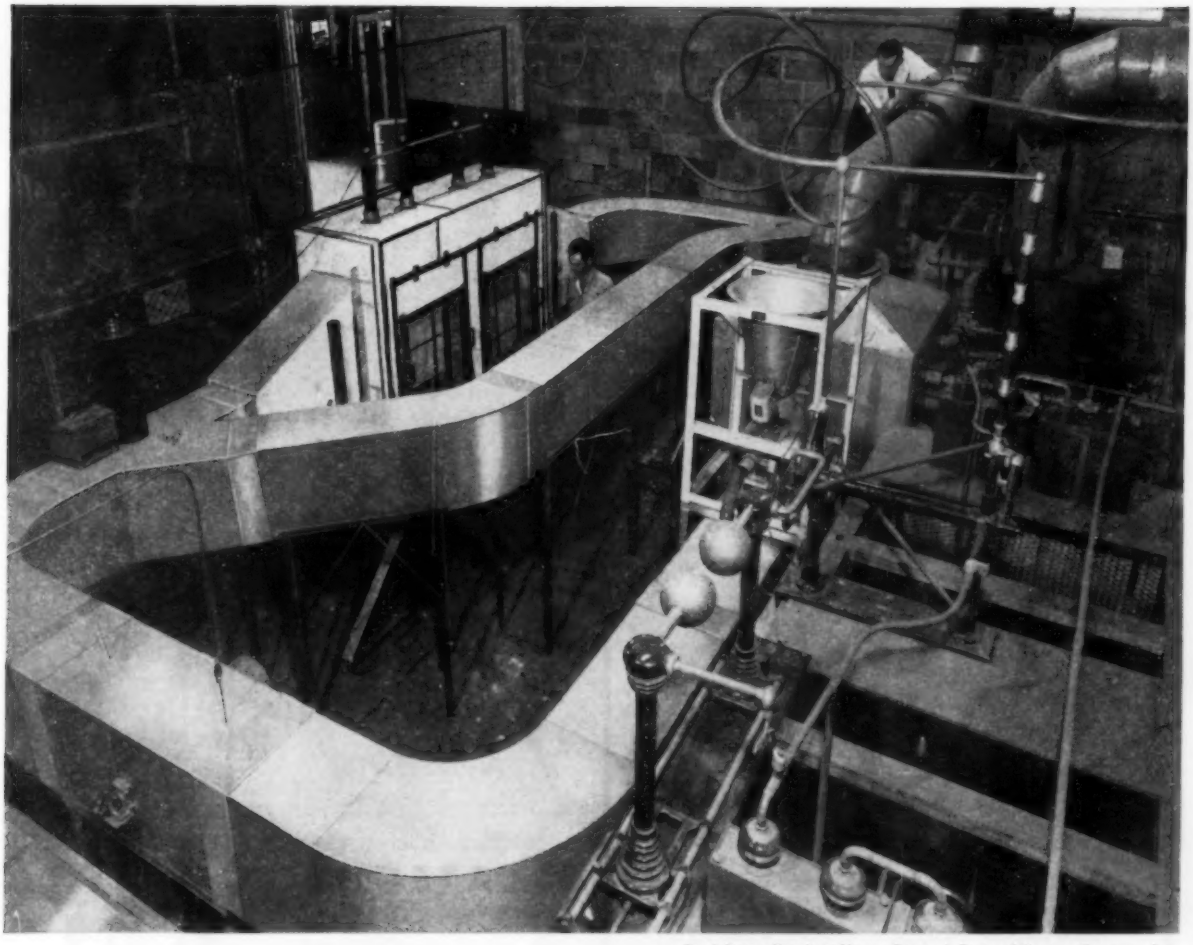

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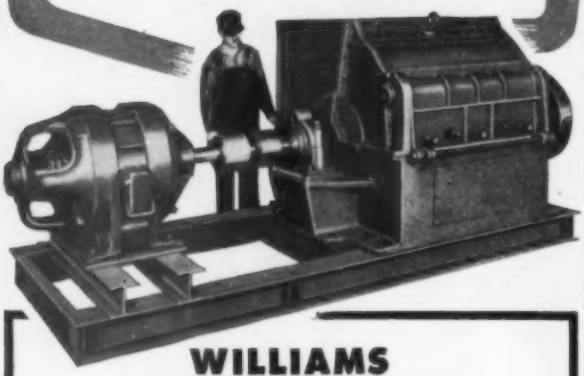

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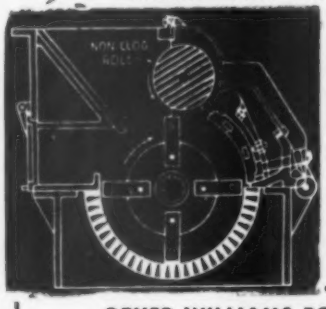

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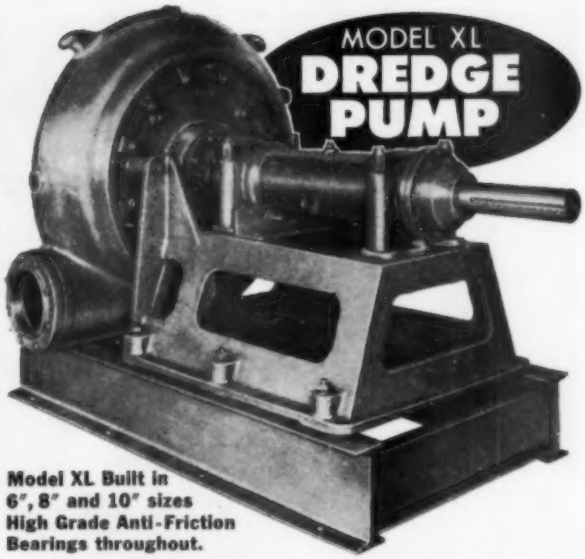

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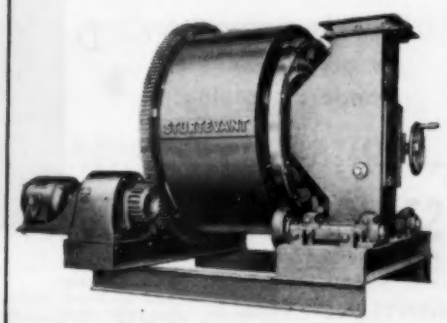

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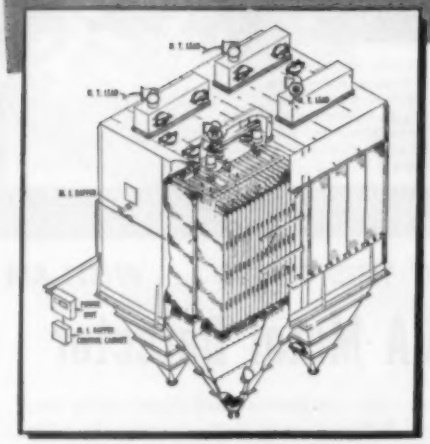

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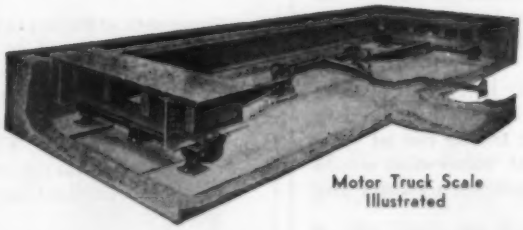

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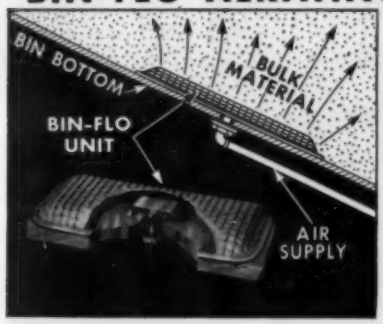

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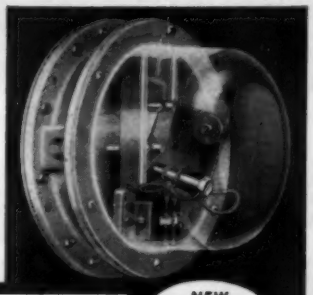

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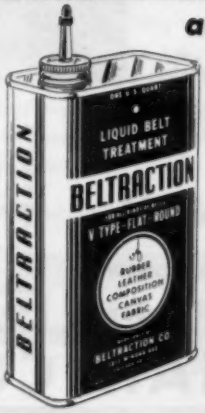

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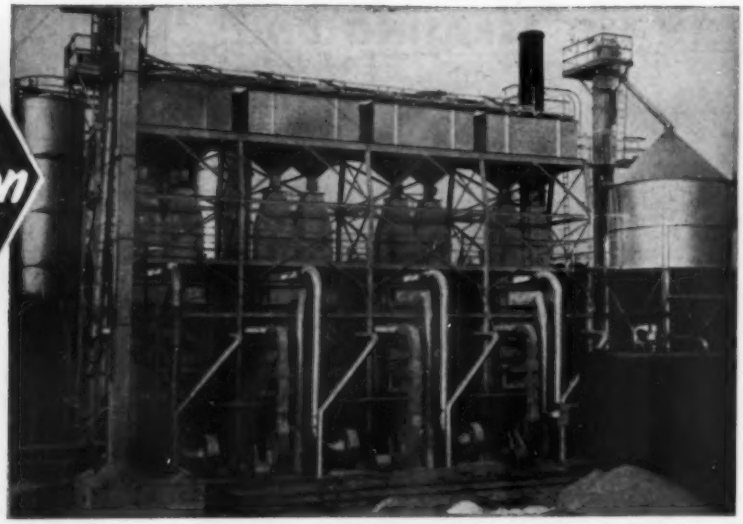

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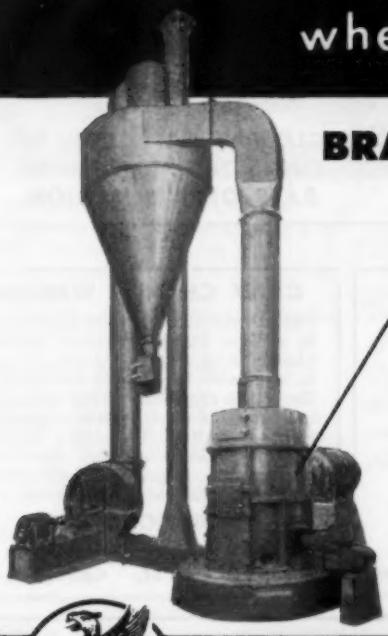

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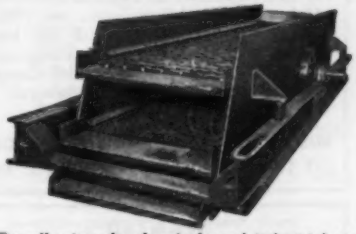

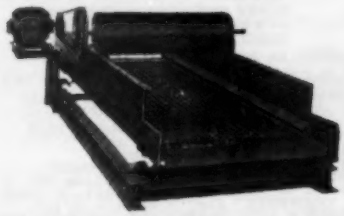

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Heavy Duty Screens from.....$1095.00 **General Purpose Screens from.....$395.00**

NEW TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. Tail pulley mounted on 2-7/16" diam. shaft. Belt is new 4-ply, 28 oz. duck 1/8" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

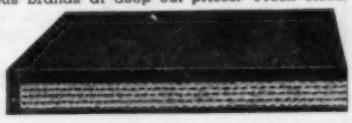
Remember, You Save Up To 50%

Belt Width	Length of Conveyor		List Price	Sale Price
16"	20'		$ 991	$ 548
16"	45'		1785	937
18"	25'		1229	684
18"	45'		1839	1005
18"	85'		3209	1665
18"	100'		3704	1912
20"	30'	(5-Ply	1453	864
20"	50'	Belt)	2189	1301
24"	25'		1322	773
24"	45'		2062	1145
24"	100'		4097	2166
24"	130'		5207	2773
30"	24'		1421	847
30"	65'		3101	1718

Other lengths & belt widths at bargain prices.

NEW CONVEYOR BELTING

Heavy duty rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	Ply	Top Cov.	Bottom Cov.	Duck Carcass	Price
16"	4	1/8"	1/32"	28 oz.	$2.62/ft.
18"	4	1/8"	1/32"	28 oz.	2.90/ft.
24"	4	1/8"	1/32"	28 oz.	3.76/ft.
30"	4	1/8"	1/32"	28 oz.	4.60/ft.
20"	5	3/32"	1/32"	28 oz.	3.95/ft.

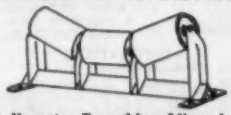
Additional widths and plies available at low prices. Write for free samples.

NEW MOTOR TRUCK SCALES

For stationary and portable applications. Scales have steel lever system complete with structural steel weighbridge. Capacities to 50 tons. Recording beams available.

28 Ton Truck Scales (Pit Type).....$ 782.00
30 Ton Truck Scales (Portable)..... 1530.00

NEW IDLERS & RETURN ROLLS



3-roll, 5" diameter Troughing Idlers for

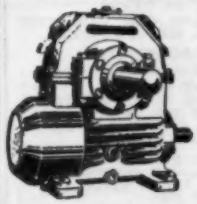
16" belt	$17.25	30" belt	$19.50
18" belt	18.00	36" belt	20.25
24" belt	18.75	48" belt	21.75

1-roll, 5" diameter Return Idlers for

16" belt	$6.75	30" belt	$ 8.25
18" belt	7.13	36" belt	8.75
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.

NEW BONDED GEAR REDUCERS



H.P.	RATIO	PRICE
3	20:1	$ 81.00
5	20:1	142.00
10	20:1	228.00
15	20:1	286.00
2	30:1	81.00
3	30:1	142.00
5	30:1	228.00
7½	30:1	228.00
10	30:1	286.00
15	30:1	384.00

Reducers are right angle & all but smallest models are fan cooled. Other sizes & ratios at bargain prices.

More than 4000 mines and quarries have modernized with Bonded equipment
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Mfgrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders
110 Bellview PHONES: Hickory 4-2166; FR 6-8898, Evenings COLUMBUS 7, OHIO

NEW—RAILS—RELAYING

Track Accessories
All prices cheerfully quoted.

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Park Bldg., Fifth Avenue - Pittsburgh, Penna.
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UD 18 International Diesel 80 H.P. Mounted on skids ready to run. Price is low.

LANDIS STONE MEAL CO.
P. O. Box 6 Rheems, Pa.

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N.Y. - CALIF. - OHIO - TEXAS

GRINDING MILLS
HARDINGE 3'x8", 5'22", 5'x36", 6'x22", 8'x32", 10'x36" & 10'x48".
BALL MILLS 3x7, 5x4, 5x14, 5x18, 6x6, 6x7, 6x8, 5x10, 6x10, 6x12, 7x5, 7x6, Marcy 86.
ROD MILLS 3x10, 4x7, 5x10, 5x14, 6x12 & 4'x14'.
TUBE MILLS, 5x18, 5x22, 5½x20, 6x8 & 6x22.

HEAVY DUTY APRON FEEDER
Rex 54"x10'3" Slat Type.

PULVERIZERS
HERCULES JUNIOR 3 ROLL MILL.
1 & 3 RAYMOND AUTOMATIC.
35" RAYMOND VERTICAL MILL.
WILLIAMS GNOME ROLLER MILL.
4' RAYMOND 4 ROLLER LOW SIDE MILL.

FILTERS, SEPARATORS—CLASSIFIERS
14'x18' & 8'x10' Oliver Drum Filters.
8'x20' Dorr DSD Duplex Classifier.
6'x14' HARDINGE COUNTER CURRENT.
DINGS MAGNETIC TYPE IR 3 STAGE 60".
DORR 40' DIA. X 30'—3 TRAY, 4 COMP. THICKENER. ALSO 3 DORR A 26'x10'.
RAKE & BOWL CLASSIFIERS, 2x15 SSFR, 6x22 DSF DORR 8x24', 10"x10" TURRENT BOWL.
2'x24'x12' Wemco Bowl Classifier.
4'6"x26'x16' Wemco Bowl Classifier.
36' Dorr Thickener & Tank.
5—Wemco Thickeners, 14x12 & 20x12.
3—Wemco 10'x50' Sand Launders.
Densifier, Wemco 48"x27'3", Double Pitch.

HAMMER MILLS
JEFFREY 36"x24" B-2 & 42"x36" Flextooth.
WILLIAMS 30 & 60 GA. & #4, 5 & 7 JUMBOS.
CEDAR RAPIDS 2033, 3033 & 4033.
GRUENDLER 2XB, 5XD, 3XD & 6XD REVERSIBLES.
PENNSYLVANIA: 8XC-15-58, 8XT-11 & 13.

ROTARY DRYERS & KILNS
Dryers: 3'x26', 4'x20', 5'x35', 6'x40', 5'x50', 5'x50', 6'x60' & 11'x75'.
Kilns: 8'45', 6'x80', 8'x125', 10'x125', & 4'x42'.

JAW CRUSHERS
BLAKE TYPE—40 x 48, 42x48, 30x36, 24x36, 18x36, 13x30, 12x24, 12x16, 10x20.
SINGLE SHAFT—18x36, 15x36, 15x30, 10x40, 10x30, 10x30.
CAM & ROLLER 24x40, 14x26, 11x26, 10x20, 6x20.

2—3-FT. SYMONS CONE CRUSHERS
1 Fine & 1 Coarse Bowl.

1500 NEW 42 IN. IDLERS
1500 Conveyor Co. Trough. & Returns.

GYRATORY FINE REDUCTION CRUSHERS
NEWHOUSE 7", 10", 14"—KENNEDY 19S, 25S, 37—SUP. McC. 6" & 10" AL. CHAL. 322R, 222R, 530R, TRAYLOR TY 56".

GYRATORY STD. PRIMARY CRUSHERS
6", 10", 14", 16", 20" & 36" SUP. McC.—GATES AL. CHAL. 3, 4, 5, 6, 7½, 8, 9, 12.
PARTS FOR 42" SUPERIOR McCULLY.

LOCOMOTIVES
2—10 Ton Plymouth Diesels.
1—65 Ton & 5—45 Ton G.E. Diesel Elec.
10 TON DAVENPORT & 25 Ton Plymouth Gas.
8—PLYMOUTH GAS. 6 - 8 - 10 TON.
23—BATTERY & TROLLEY, 4, 6, 8, 10 TON.

LOCOMOTIVE CRANES
30 TON OHIO STEAM, 50 FT. BOOM.

60 FT. CRANE BOOM
1—60 Ft. Latticed Steel Crane Boom. $500.

MERRICK WEIGHTOMETERS
7—42 In. 30 In. 24 In. 18 In.

STEEL DERRICKS
GUY: 8 TON 85 FT. BOOM, 25 TON 60 FT. BOOM, 15 TON 100 FT. BOOM, 20 TON 115 FT. BOOM, 50 TON 100 FT. BOOM.
STIFF LEG: 5 TON 70 FT. BOOM, 15 TON, 100 FT. BOOM, 25 TON 100 FT. BOOM, 75 TON 135 FT. BOOM. 1—5 TON 100 FT. BOOM.

ASPHALT & OIL TANKS
15—5,000, 10,000 & 20,000 GAL. CAP. WITH COILS. 6—10,000 GAL. R.R. CAR TANKS.

200 KW G.M. DIESEL GEN.
1—3/60/220/440. Used 100 Hrs.

RAILWAY CARS
177—DUMP STD. GA.—20, 16, 12, 6 & 4 YD.
36—FLATS—10 TON, 40 TON, 50 TON CAP.
44—TANK CARS—8,000 & 10,000 GAL. CAP.
75—V Dump Cars, 1½ & 3 Yd.

R. R. CAR DUMPER
150 TON CAP. STD. GA. CAR DUMPER.
150 TON R. R. TRACK SCALE
60 FT. HOWE ICC NEW 1945.

AIR COMPRESSORS—ELECTRIC
198, 420 & 676 WORTHINGTON BELTED.
1302 CFM & 1574 CFM INGER RAND PRE-S
1170 CFM GARDNER DENVER HAE1034-2300 V.
2300 CFM—OCE—CHGO. PNEU. ELEC.
3078, 3664 & 5040 CFM Inger. Rand.

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FOR SALE or RENT

1¼ yd. Manitowoc 2000B Crane, 1947
½ yd. Unit 1020 motor crane 1946.
30 ton Ind. Brownhoist Gas Loco. Crane.
25 ton Orton Diesel Loco. Crane.
65 ton Porter Diesel-Elec. Locomotives.
44 ton GE Diesel-Elec. Loco., new 1942.
30 ton American Guy Derrick 100' bm.
30 yd. Western & Koppel Air Dump cars.
1200 CFM Ing. Rand XRE, 200 HP Compr.
100 HP Lambert 3D Elec. & Swinger.
130 HP Christian 2D Diesel Hoist.

MISSISSIPPI VALLEY EQUIPMENT CO.
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GRAVEL CRUSHING PLANT
1½ YD. DRAGLINE
Give complete description.
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NORTHWEST 80-D

2½ cu. yd. Shovel
w/Murphy Diesel Engine

1947 machine in good working condition. "As is, Where is," location Bronx.

$13,000.00

H. O. PENN MACHINERY CO. INC.
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2020 New Holland Impact Breaker with top feed chute. Condition like new. Nevada location. Priced right.

James A. Nissen Co.
170 Sterling Ave., Auburn, Calif.

JAW CRUSHERS—7" x 12" up to 48" x 60".
CRUSHING ROLLS—16" x 10" up to 72" x 20".
GYRATORY CRUSHERS—22 up to 212. Also one 6", 10", 14" & 16" Superior McCully gyratory crusher.
4½' x 40, 7 x 120, 8 x 55, 8 x 125' Kilns.
DIRECT HEAT ROTARY DRYERS—4' x 30', 4½' x 30', 5' x 50', 6' x 60', 11' x 75'.
3—3 Roll Bradley Hercules Mills & 300 H.P. Motors.
222-322 Allis-Chalmers type B Hydrocone Crushers.
Hardinge, Marcy & Fuller-Lehigh mills.
1—New 9½' x 11' Ball Mill & 6' x 22" Hardinge Ball Mill.
ROD & BALL MILLS—4' up to 7' dia.
5½' x 22', 6 x 22' Tube Mills.
New—Used & Rebuilt Kilns—Coolers—Dryers.
2—New 6½' x 150 Kilns.

W. P. HEINEKEN, INC.
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PLANT & QUARRY SUPERINTENDENT—25 Years Experience — Operation — Maintenance — Plants and Quarries in Feldspar — Limestone — Kaolin — Phosphates — Sand & Gravel and Rock Products. Available for an interview at your convenience.

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Special—Model 502 Koehring 1¼ yd. dragline with Caterpillar Diesel motor and 80' boom.

Michigan TLDT truck crane	Pioneer 17V Diesel port. plant	Butler fork truck
Lorain ¾ yd. dragline	Pioneer Mesabi 5x12 screen	3000# wrecking ball
Lorain ½ yd. dragline	Pioneer Mesabi 4x16 screen	Eagle cinder crusher
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Ransome 4½ yd. mixer	Cedar Rapids 16x16 roll crusher	1.5 KVA light plant

These machines reconditioned in our newly-built daylight plant. Come see them!

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INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — FIRE, WATER, SUCTION, AIR, STEAM AND WELD HOSE

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Units of Every Size and Description

SQUIRREL CAGE MOTORS

3 phase, 60 cycle, 220 or 440 Volts
(*2300 volts or higher)

H.P.	Make	Type	Speed
1250	*Al-Ch	ANW	1200
800	*Westg.	C8	3600
800	*Westg.	C8-1485	1800
700	Al-Ch	AN	900
500	*Al-Ch	6316-8W	1800
500	G.E.	KT-424	450
400	G.E.	KF-539	3600
400	G.E.	KT-424	360
350	Ideal	A	1800
300	*G.E.	K-6344Y	1200
300	G.E.	K-6353 TEFC	720
250	*Al-Ch	OEX-148	720
250	*G.E.	IK	600
250	G.E.	IK-17A	600
250	Westg.	C8-14	514
200	*G.E.	FT-549Y	3600
200	*G.E.	IK-13B	1800
200	*Al-Ch	AN	720

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POSITION WANTED

Desire position as Cement Plant Superintendent. 35 years experience in Cement Plant Construction and Management. Single, can go anywhere. Reply:

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20 Ton Brownhoist Railroad Crane, Rebuilt, G.M.C. Diesel Motor—Torque converter—new cab—40' Boom—8 wheel truck—cast iron frame.

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CRUSHER SALES ENGINEER

Well-known, midwest manufacturer of complete line of crushers and other machinery for Quarries, Gravel Plants and Contractor Aggregate Producers has excellent opportunity for experienced sales engineer to work with several good distributors and their salesmen in Southeastern States.

Headquarters would be in or near Atlanta, Georgia and territory consists of the states south of and including Tennessee and North Carolina and east of the Mississippi River. This is a permanent, well-paying position with the opportunity to become Southeast District Manager and to increase earnings after showing ability to produce results.

Give complete outline of education and experience and submit recent snapshot or photograph. All replies held absolutely confidential.

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Used equipment for sale in all parts of the country. We welcome your inquiries.

36" gyrasphere crusher—P & H 855 drag & shovel front—150 KVA generator set.

Jaw crushers up to 48 x 60—gyratories—2', 3', 4' cones—roll crushers—rod & ball mills—hammer mills—screening, washing & crushing plants.

Classifiers — compressors — converters — conveyors — blast hole drills — dump cars — engines — feeders — generators — hoists — kilns & dryers — locomotives — motors — pumps — shovels & draglines — screens — transformers — Euclids.

List your equipment with us.

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Theatre Bldg. Tel. 600 Crosby, Minnesota

FOR SALE

	Price
1—Minnesota Moline Gas Engine #162617-B, 4½ x 6—6 cyl. Model HEB. A-1 Condition	$1,000.
1—Robbins Gyrex Scalping Screen 48" x 96—G.S. 7053. Including: 1 Set Mang. Steel Screen Plates 6½" x 7", 2½ Sets Mang. Steel Screen Plates 6" x 6", 1 Set Mang. Steel Screen Plates 5" x 5", 2½ Sets Mang. Steel Screen Plates 4" x 4". Good Condition	1,500.
2—Toledo Dial Scales, 100 lb. Cap., 4 oz. Graduation Style 0861-AR Nos. 663192 - 658365 - 681097. Good Condition ea.	100.
1—Exact Weight - Bagging Scale, #211665, Style 2225. A-1 Condition	200.
1—Omatic Tagline — Model 636 — A-11375. Condition New	150.
1—ORR—Sambower S.D. Hoist, Drum 32" Dia.—26 Face Drum Shaft 3¾" Jack shaft 3-3/16" Driven pulley 36" Dia. 11—Grove C. Belts, Pinion 13 teethDrum gear 70 teeth. Condition Good	500.

PUMPS

	Price
1—10" Allis-Chalmers Centrifugal Pump Type-S #12966 Ft. Head 180 3400-GPM, RPM 1760, with Base and 100 HP—G.E. Motor, 440 V. — 3 ph. — 60 cy. Condition Good	1,200.
1—6 x 8 Centrifugal Pump with Base and 60 HP Westinghouse Motor, 440 V—3 ph.—60 cy., RPM 1760. Condition Good	700.
1—6 x 6 Worthington Centrifugal Pump #735612, with Base and 40 HP Westinghouse Motor, 440 V.—3 ph.—60 cy. RPM 1760. Condition Good	500.

PACKAGE CONVEYORS—Flat, Complete with Motors and Plug-in Cords. Mounted on Casters. 440-3ph-60 cy.

	Price
1—16"x56'—3 H.P. M. Gear Motor..	$ 800.
2—16"x30'—2 H.P. M. Gear Motor..	1,000.
1—16"x30'—2 H.P. M. Gear Motor, with Elev. Truck Adjust Height	600.
2—16"x21'—2 H.P. M. Gear Motor..	900.
2—16"x12'—1 H.P. M. Gear Motor, Used for inside car loading	750.
2—30"x6'—1 H.P. M. Gear Motor. Used under Baggers	800.
1—14"x21' Stacker Raised to 9'-6", 2 H.P. Westinghouse Motor, 1720 RPM Chain Drive	350.

These Conveyors purchased 1948. Some used 2½ years—All in A-1 condition. Some New—Never Used.

MOTORS

SQUIRREL CAGE MOTORS—3 phase, 60 cycles, 440 volts

HP	Name	Type	RPM	Description	Code #
3	Robins-Meyers	K	1150	Serial #P-322830 Fr. 203 S.B.	21
5	Gen. Elec.	K-T 952	900	Serial #4641486 S.B.	92
5	Westinghouse	K-T 4-5-A	1800	Serial #634498 S.B.	27
5	Westinghouse	Plate missing	1180	Serial ..... S.B.	8
7½	Gen. Elec.	F.T. 958	870	Model #74-A-164 S.B.	23
7½	Watson	K.H.	1720	Serial #54900 S.B.	89
7½	Westinghouse	.....	870	Serial #4384524 Fr. 370 C-S.B.	24
7½	Westinghouse	.....	1160	Serial #4239921 Fr. 352C S.B.	39
7½	Westinghouse	.....	1160	Serial #4238793 Fr. 352C	41
10	Wagner	B.P.	1140	Serial #78830 S.B.	44
20	Howell	SCE	1200	Serial #76549 Fr. 316-E B.B. Intermittent Use	29

SLIP RING MOTORS—3 phase, 60 cycles, 440 volts

7½	Allis-Chalmers	ARY	1720	Serial #80199K-Y-711D-1-1 B.B. Fr. 284 with controls	68
40	Gen. Elec.	MT-342	860	Serial #2303593 S.B. with controls	12
40	Universal	.....	870	Serial #2367407 S.B. with controls	11
60	Westinghouse	.....	870	Serial #4317603 Fr. 648-A S.B.	2

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THOMASVILLE, PENNSYLVANIA

JOHN F. MEISSNER ENGINEERS, INC.

Consulting & Designing Engineers

CONVEYOR SYSTEMS
CRUSHING PLANTS
SCREENING PLANTS
STORAGE METHODS
SHIP AND RAIL LOADING
REPORTS, SURVEYS

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One used Tyler Type V-50 Double Deck Hummer Screen 4' x 5' screens, 4' x 8" Frame, with one Thermionic Power Converter Model No. 618-6, 220 volt, 60 cycle complete. This material is in first-class condition.

GOUVERNEUR TALC COMPANY, Inc.
Gouverneur, New York

FOR SALE

STURTEVANT #1 RING ROLL MILL
STURTEVANT #1½ RING ROLL MILL
3' RAYMOND AIR SEPARATOR
STURTEVANT 20x14 AND 16x10 ROLLS

J. H. PERKOSKI
Investment Building
Pittsburgh, Penna.

Be Wise . . .

Use Space in
THE BROADCAST SECTION
of PIT AND QUARRY

FOR SALE

LOCOMOTIVES

1—Brookville—24" Ga.—Gas $3042.
2—G.E. 25 Ton Diesel Electric.
2—Plymouth 8 Ton Gas Std. Ga.
1—Plymouth 8 Ton Gas—30" Ga.
1—Whitcomb 30 Ton S.G. Diesel #40154—almost new.
2—G.E. 44 Ton Heavy Duty Diesel Electric.
1—Whitcomb 65 Ton Diesel Electric. New 1944.

2—BROOKVILLE 12 TON S.G. DIESEL—NEW—BARGAINS. #2983-4.

CARS

8—Koppel 30 Yd. Air Dump—Lift Doors.
21—15 Ton Hopper 36" Ga.
2—Unusually nice 50 Ton Twin Hoppers Cross Dump.

MISCELLANEOUS

2—Conway 75 Muckers—#356 & 305. Large Number. New Repair Parts. Very Cheap.
Bridgeford Axle Lathe.
Southwark 100 Ton Hyd. Press.
Mundy 2 Drum Elec. Hoist—300 H.P.
Browning 35 Ton Revolving Gantry, 230 D.C.
1—Whiting—Type B-2 Screw—Pit Drop Table—New—Cheap.
Orton 15 Ton Diesel Loco. Crane—#42852.

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2005-13 W. Bellevue St. Philadelphia 40, Pa.
Phone SA. 2-7132

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We have moved our Executive Offices from New York City and our Shops from Newark, N.J. to

HOBOKEN, NEW JERSEY

where we shall continue our 37 years of service to you.

ROTARY DRYERS:

8—6′ x 40′, 5′ x 40′ Ruggles-Coles; 54″ x 25′ Class Xf-4 Ruggles-Coles, also 3—3′ x 50′, 5′ x 50′, 6′ x 60′, 7′ x 70′ Direct Heat. Also 3—6′ x 50′ Louisville Rotary Steam Tube.

3—Link Belt Roto Louvre Dryers—#207-10 (2′7″ x 10′); #502-16 with all stainless steel contact parts; #604-20.

3—3′ x 50′ (or Coolers) made by Bonnot Co., Canton, Ohio.

ROTARY KILNS:

1—6′ x 120′ Vulcan Rotary Kiln.

CRUSHERS:

Jaw—2″ x 6″, 6″ x 15″ Sturtevant, 18″ x 36″ and 24″ x 36″ Farrel; 42″ x 48″ Traylor; Rolls; 42″ x 16″ Allis Chalmers Type B; 24″ x 32″ Penna Single Roll. Portable Plants; Cedar Rapids 1036-BBB; 2540-AAAA, 2036-AA. Also Pioneer with 30″ x 42″ primary and secondary Crushers, all Diesel driven.

PULVERIZERS:

1—#5047 Raymond High Side Mill.

2—#6669 Raymond Super Mills

6—#1, #0, #00, #000 Raymond Mills.

3—#0, #00, 8″ Raymond Screen Mills

2—#51 Raymond Imp. Mills

3—Mikro #4TH, #2TH, Bantam SH

BALL AND TUBE MILLS:

6—Hardinge Mills, 3′ x 8″, 5′ x 22″, 6′ x 22″, 8′ x 48″.

4—Tube Grinding Mills, Made by Traylor, E. & M. Co. Allentown, Pa. Silex Lined, 4″ x 13′, 4′6″ x 18′6″, 5′ x 22′ and 5′ x 20′.

8—Pebble Mills, porcelain lined; 3—6′ dia. x 8′, 800 gals. each. 1—6′ x 5′, 3—5′ x 4′, each with ball charge.

AIR SEPARATORS:

2—Raymond 6′ x 16′ dia.; 1—8′ Gayco; 1—8′ Sturtevant.

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All sizes Oliver Rotary Vacuum Filters.

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Fuse and caps are prepared in the usual way, with the addition of a connector crimped on the free end of the fuse. This connector protects the fuse powder train during rain storms, and is slotted to provide a firm, positive connection for the Quarrycord.

After the blockholes are loaded, the Quarrycord is run from hole to hole, and inserted into the slot of each connector. The top of the connector is pressed down over the Quarrycord, locking it firmly in place. The free end of the Quarrycord is then run out to a spot where it can be easily lighted.

Plan your Quarrycord hookup so that the fuse in each blockhole is lighted before the first hole goes. Several groups of boulders can be prepared in this manner, and when all is in readiness, the blaster lights the Quarrycord for each group, and walks to a place of safety.

Q-1

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT
Manufacturers of Primacord-Bickford Detonating Fuse and Safety Fuse
Established 1836

Ensign-Bickford Quarrycord is packed on spools in 500 ft. lengths. See your explosives supplier or write us.

ENSIGN-BICKFORD *Quarrycord*

for lighting Safety Fuse in Secondary Blasting

INDEX TO ADVERTISERS

Acme Road Machinery Co. 266
Ajax Flexible Coupling Co., Inc. 194
Albemarle Paper Mfg. Co. 17
*Allis-Chalmers Mfg. Co. 31, 82
*Allis-Chalmers Mfg. Co., Tractor Div. 44-45, 163
American Air Compressor Corp. 267
American Brake Shoe Co. 63
American Crankshaft Co. 266
American Cyanamid Co. 33
American Hoist & Derrick Co. 189
*American Pulverizer Co. 24
American Rubber Mfg. Co. 176
*American Steel & Wire Div., U. S. Steel Corp. 2
Anaconda Wire & Cable Co. Sub. of Anaconda Copper Mining Co. 144
Andrews Equipment Service 244
Armstrong-Bray Co. 258
Atlas Powder Co. 187
Austin-Western Company 111

*Babcock & Wilcox Co. 11
Baker Lull Corp. 35
Baldwin-Lima-Hamilton Corp. Construction-Equipment Div. 111
*Barber-Greene Co. 102, 175
Basic Refractories 267
Bay City Shovels 167
Beltraction Co. 263
*Bemis Bro. Bag Co. 23
*Bergen Machine & Tool Co., Inc. 229
*Besser Co. 201, 224-225, 238, 247
*Bethlehem Steel Co. 101
*Bin-Dicator Co. 263
*Blower Application Co. 263
Bonded Scale & Machine Co. 269
Boyer, R. H. 271
Bradley Pulverizer Company 265
Brake Shoe & Castings Div. of American Brake Shoe Co. 63
Brandeis Machinery & Supply Co. 268
Brill Equipment Co. 273
Broadcast Section 266-273
Bucyrus-Erie Company 126
*Buell Engineering Co., Inc. 196
*Burmeister Co. 235

Cape Ann Anchor & Forge Co. 64
Carlyle Rubber Co., Inc. 270
Carpenter Manufacturing Co. 243
Caterpillar Tractor Co. 18, 133
Chase Bag Company 66
Chase Foundry & Mfg. Co. 241
Chicago Electric Co. 271
Cities Service Oil Co. 99
Clark Equipment Co. 249
Cleveland Vibrator Co. 236
Cleveland Wire Cloth and Mfg. Co. 182
Cleveland Worm & Gear Co. Inside Back Cover
Clipper Mfg. Co. 202
Colonial Iron Works 233
Colorado Fuel & Iron Corp. 7, 48
Columbia Machine 250
*Combustion Engineering, Inc. Raymond Division 170-171
Concrete Equipment Co. 238
Concrete Machinery Co. 243
Consolidated Products Co. Inc. 272
Continental Gin Co. 178
*Cummins Engine Co., Inc. 46-47

Darden Industries, Inc., Roy 243
*Deister Concentrator Co. 161
*Deister Machine Co. 4
Dempster Brothers, Inc. 149
Detroit Diesel Engine Div. General Motors Corp. 181
De Zurik Shower Co. 241
*Diamond Iron Works, Inc. 195
Dodge Manufacturing Corp. 183
Du Pont de Nemours & Co., E. I., Inc. 116
*Dwight-Lloyd, Inc. Div. of Sintering Machy. Corp. 265

*Eagle Crusher Co. 130
*Eagle Iron Works 121
*Easton Car & Construction Co. 3
Eaton Mfg. Co. 100
Edick Laboratories 240
Elmco Corporation 15, 91
Ellernan Co. 264
Ensign-Bickford Co. 274
Equipment Corp. of America 267
Erickson Power Lift Trucks, Inc. 241
*Erie Strayer Co. 123
*Euclid Division, General Motors Corp. 96

*Farrel-Bacon 174
Fate-Root-Heath Co. 253
Fiske Brothers Refining Co., Lubriplate Div. 59
Flexible Steel Lacing Co. 164
Frank, M. K. 269
Frog, Switch & Mfg. Co. 174
*Fuller Co. 28, 191

Gates Rubber Co. 14
Georgia Iron Works 172
Gilson Screen Co. 161
Goodyear Tire & Rubber Co. 1
Gulf Oil Corp. 37

H & L Tooth Company 261
Hannon & Sons, F. D. 150
*Hardinge Company, Inc. 177
Hawkins & Co. 273
Haver & Boecker 255
Hazard Insulated Wire Works 157
Heat and Power Co. 268
Heidenreich, E. Lee, Jr. 266
Hemleb, Cliff 272
*Hendrick Mfg. Co. 264
Hendrix Mfg. Co. 256
Hercules Motors Corp. 53
Hercules Powder Co. 67
Hetherington & Berner, Inc. 263
*Hewitt-Robins, Inc. 60-61
Hoffman Co., George W. 245
Hough Co., Frank G. 180

*Ingersoll-Rand Co. 156
International Harvester Co. (Industrial Power Div.) 147
International Nickel Co. 151
*International Paper Co., Bagpak Div. Inside Front Cover
*Iowa Manufacturing Co. 148, 193

Jaeger Machine Co. 122
Jeffrey Manufacturing Co. 16
*Johns-Manville Co. 68-69
*Joy Manufacturing Co. 51

Kaiser Aluminum & Chemical Sales Co. 139
Kansas City Hay Press Co. 258
*Kennedy Van Saun Mfg. & Engrg. Corp. 128-129
*Kent Machine Co. 231
King Powder Co. 186
*Koehring Co. 40-41
Koppers Co., Inc. 257
*Kraft Bag Corp. Back Cover

La Roi Company 251
Leschen Wire Rope Division, H. K. Porter Company, Inc. 49
Lincoln Electric Co. 52
*Link-Belt Company 8, 71
*Link-Belt Speeder Corp. 142
Littleford Bros., Inc. 241
Lone Star Cement Corp. 198
Lubriplate Division, Fiske Bros. Refining Co. 59

Manhattan Rubber Div. Raybestos-Manhattan, Inc. 173
Manheim Mfg. & Belting Co. 185
*Marion Power Shovel Co. 56-57
*McLanahan & Stone Corp. 29
Medusa Portland Cement Co. 227
Merrick Scale Mfg. Co. 161
Mid-Western Industries 145
*Morris Machine Works 166
Motorola Communications & Electronics, Inc. 6
Murphy Diesel Co. 155

National Conveyor & Supply Co. 234
National Wire Cloth Co. 242
*Naylor Pipe Co. 38
Neff & Fry Co. 190
Nopco Chemical Co. 77
*Nordberg Manufacturing Co. 112
*Northern Blower Company 30
Northwest Engineering Co. 5

Olsen Corp., Gene 221
O'Neill, A. J. 273
Oswalt Engineering Service Corp. 247
Owen Bucket Company 162

Page Engineering Co. 160
Penn-Dixie Cement Corp. 240
Pennsylvania Drilling Co. 272
Perry Equipment Co. 272
Philadelphia Block & Supply Co. 244
Philadelphia Gear Works 146
Portland Cement Assn. 239
Power Equipment Co. 272
PreCaster, Inc. 232

Quinn Wire & Iron Works 242

Radio Corporation of America 261
Raybestos-Manhattan, Inc. Manhattan Rubber Div. 173
*Raymond Div. of Combustion Engineering, Inc. 170-171
Reichard-Coulston, Inc. 242
Remmey Sons Co., Richard C. 140
*Research Corp. 262
Rust-Oleum Corp. 81

Sauerman Bros., Inc. 168
Schaffer Poidometer Co. 188
Scheu Products Co. 242
*Schramm, Inc. 159
*Screen Equipment Co. 27
Servicised Products Co. 236
Sheffield Steel Corp. 70
Shell Oil Co. 124-125
Simplicity Engineering Co. 114
Sinclair Refining Co. 143
*Sly Mfg. Co., W. W. 32
*Smidth & Co., F. L. 13
Smith Engineering Works 25, 80
Smith Inc., L. B. 269
Solvay Process Division 248
Spang & Company 169
Sprague & Henwood, Inc. 192
Stanco Mfg. & Sales Co. 158
Standard Dry Kiln Co. 238
Standard Metal Mfg. Co. 65
Standard Stamping & Perforating Co. 260
Stanhope, Inc., R. C. 270
*Stearns Manufacturing Co., Inc. 252
Straub Mfg. Co. 98
*Sturtevant Mill Co. 259
Superior Pneumatic & Mfg., Inc. 242
*Syntron Co. 34, 186

*Thermoid Co. 117
Thomas Steel Forms 213
Thomasville Stone & Lime Co. 271
Three Point Belt Lacing Co. 174
Timken-Detroit Axle Div. 54-55
Tinney Drilling Co. 263
Torrington Co. 115
Travel-Batcher Co. 200
*Traylor Engrg. & Mfg. Co. 9
Trinity Div. General Portland Co. 246
Truck-Man Div. of The Knickerbocker Co. 239
Truckstell Mfg. Co. 237
Twin City Concrete Pipe Co. 245
*Twin City Iron & Wire Co. 240
*Tyler Co., W. S. 179

Union Bag & Paper Corp. 21
United States Rubber Co. 276
*United States Steel Co. 2, 113
*Universal Door Carrier, Inc. 238
*Universal Engineering Corp. 153
Universal Road Machinery Co. 184
*Universal Vibrating Screen Co. 97
Unverzagt & Sons, G. A. 267

Victor Equipment 90
Virginia Gear & Machine Co. 146
Virginia-Carolina Chemical Corp. 79

Webb Corporation 262
*Wellman Engineering Co. 43
Wenzel Machinery Rental & Sales Co. 266
*Western Precipitation Corp. 254
Whayne Supply Co., Roy C. 266
*Wickwire Spencer Steel Div. Colorado Fuel & Iron Corp. 7
*Williams Patent Crusher & Pulv. Co. 258
Williams, Roger F. 240

*Yuba Manufacturing Co. 165

★ See also Detailed Information in 1954 Pit and Quarry HANDBOOK

Capacity of cement plant lifted 77% with the help of U. S. Rubber belting

View of new conveyor gallery coming from No. 2 primary crusher. This cement plant uses over a mile of U.S. Belts (10 belts in all)—to handle crushed limestone rock, wet filter cake and coal.

View of U.S. Giant Style YN Conveyor Belt carrying crushed limestone rock.

The recent expansion and modernization of a midwest cement plant lifted capacity 77%, from 4500 barrels to 8000 barrels a day. During the planning stage, United States Rubber Company's 3-Way Engineering service got on the job. By working with engineers of the conveyor system and engineers of the cement plant, the most efficient system to handle the increased capacity of the plant was designed and built. In this case "U. S." engineers recommended U. S. Giant® Style YN Conveyor Belting utilizing nylon for troughability and superior impact resistance. The "U.S." 3-Way Engineering service is available for any materials-handling problem. It is a service that will always produce an efficient low cost haulage system, whether the installation is large or small.

The "U.S." belting line contains a belt for handling any type of material. Whatever your haulage problem may be, U.S. Conveyor Belting is obtainable from your "U.S." distributor. Or you may get in touch with any of our 27 District Sales Offices or write address below.

"U.S." Research perfects it.
"U.S." Production builds it.
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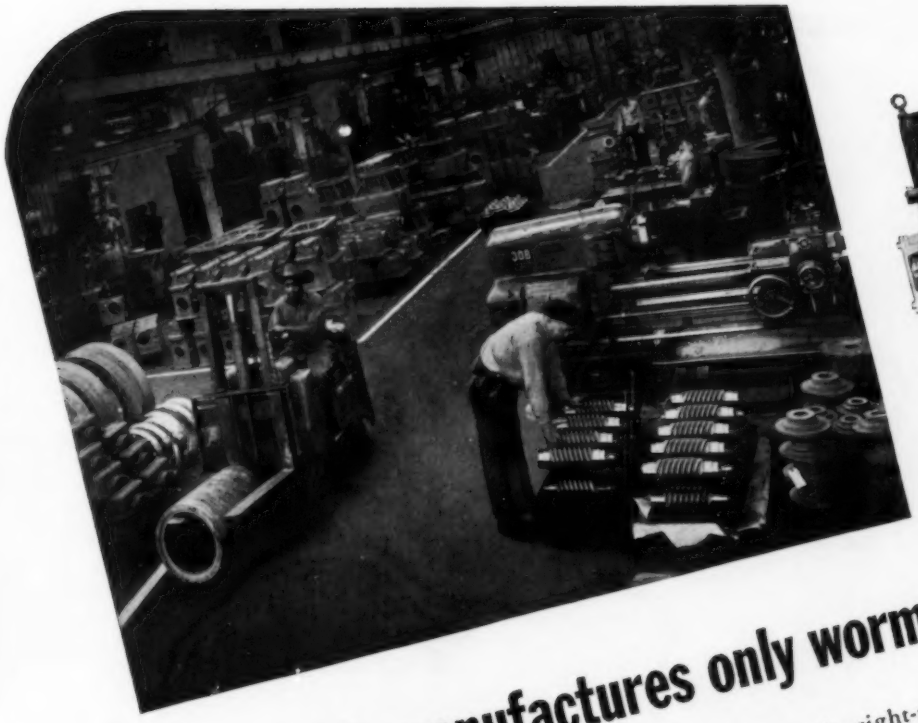

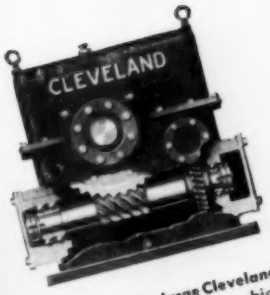

Cutaway of a large Cleveland double reduction unit which affords a high reduction ratio in limited space. Left: Assembly floor in the main Cleveland plant.

Why CLEVELAND manufactures only worm gear drives

AS EVERY machine designer knows, the right-angle construction of a worm gear drive saves space. Experience demonstrates that soundly engineered worm gearing is a highly efficient drive. And finally, perfectly matched case-hardened steel worms and nickel-bronze gears form rugged units that can outlast the machines they drive.

By devoting its entire engineering and production talent for 42 years to worm gearing alone, the Cleveland Worm and Gear Company has been able to put out the best product of its kind. As a result of this concentration, backed by top-notch performance of its products, *Cleveland leads in the manufacture of worm gearing.*

There are, of course, drive applications where worm gearing is out of place and uneconomical. Our engineers will advise you frankly. But we urge you to look into Clevelands whenever you contemplate installing a speed reducer. Free Catalog 400 will give you full engineering data and our sales representatives are ready to advise you. The Cleveland Worm and Gear Company, 3280 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

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3
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